SURVEY, CONSTRUCTION & GIS PRODUCT CATALOG

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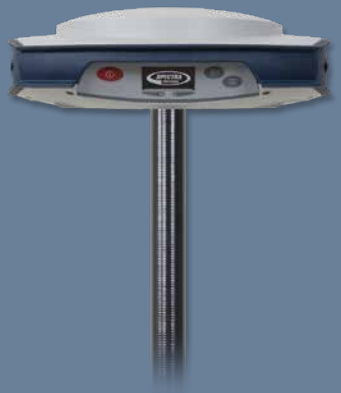
SP80



- Z-Blade technology
- WiFi, SMS and e-mail communication
- Anti-theft technology
- eLevel technology
- Backup RTK and RTK bridge
- Hot-swappable batteries
- Inside-the-rod antenna
- 3.5G cellular modem
- Trimble RTX services

The Spectra Geospatial SP80 GNSS receiver is a powerful, rugged and easy-to-use system designed for everyday surveyors. The SP80's Z-Blade GNSS-centric technology delivers fast and reliable GNSS positioning utilizing all available GNSS signals to produce the optimal solution even in challenging environments. GPS-only, GLONASS-only or BeiDou-only positioning modes are available when necessary.

Unique communication technologies keep the surveyor connected. Web UI access via WiFi and SMSs can be used to monitor and configure the receiver. RTK bridge can save you money as network corrections can be relayed via radio to any rover in the survey job area. Anti-theft technology protects your investment by sending emails and SMSs to alert users as well as making the receiver unusable if the SP80 base has been moved.

SP80 users remain productive in challenging situations. During RTK outages, backup RTK automatically switches to a secondary correction source so that valuable time and money in the field is not lost. The patented inside-the-rod antenna extends the RTK radio range as well as protects the antenna. Dual hot-swappable batteries can be exchanged in the field for an interruption-free work day. The sunlight-readable display offers instant access to key product information to monitor and configure the receiver.

Created by Spectra Geospatial's engineering design lab in Germany and supported by a standard two-year warranty, the SP80 is the most reliable, durable and productive system to get the job done.

GENERAL

- 240 GNSS channels
  - GPS L1C/A, L1P(Y), L2C, L2P(Y), L5
  - GLONASS L1C/A, L1P, L2C/A, L2P, L3
  - Beidou (Phase II) B1, B2
  - Galileo E1, E5a, E5b
  - QZSS L1C/A, L1-SAIF, L1C, L2C, L5
  - SBAS L1C/A, L5 (WAAS, EGNOS, MSAS, GAGAN, SDCM)
  - IRNSS L5
- All operation modes
- RTK rover & base
  - RTK network rover: VRS, FKP, MAC
  - NTRIP, Direct IP
  - CSD mode
  - Postprocessing
  - UHF networking and Relay mode
  - Backup RTK
  - RTK bridge

TECHNICAL SPECIFICATIONS

Real-time accuracy (RMS) [1,2]

SBAS (WAAS/EGNOS/MSAS/GAGAN)

- Horizontal: <50cm
- Vertical: <85cm

Real-time DGPS position

- Horizontal: 25 cm + 1 ppm
- Vertical: 50 cm + 1 ppm

Real-time kinematic position (RTK)

- Horizontal: 8 mm + 1 ppm
- Vertical: 15 mm + 1 ppm

Instant-RTK initialization

- Horizontal: 8 mm + 0.5 ppm
- Vertical: 15 mm + 0.5 ppm
- Typically: 2 sec
- Reliability: up to 99.9%
- RTK initialization range: over 40 km

Trimble CenterPoint. RTX Positioning[7]

- Horizontal accuracy: 4 cm
- Vertical accuracy: 9 cm

Postprocessing accuracy (RMS) [1,2]

Static & fast static

- Horizontal: 3 mm + 0.5 ppm
- Vertical: 5 mm + 0.5 ppm

High-precision static[3]

- Horizontal: 3 mm + 0.1 ppm
- Vertical: 3.5 mm + 0.4 ppm

MEASUREMENTS

- Patented Z-Blade technology
  - Full utilization of signals from all 6 GNSS systems (GPS, GLONASS, BeiDou, Galileo, QZSS and SBAS)
  - Enhanced GNSS-centric algorithm fully independent GNSS signal tracking and optimal data processing including GPS-only, GLONASS-only or BeiDou-only solution (Autonomous to full RTK)
  - Fast Search engine for quick acquisition and re-acquisition of GNSS signals
- Patented SBAS ranging for using SBAS code & carrier observations and orbits in RTK processing
- Patented Strobe Correlator™ for reduced GNSS multi-path

PHYSICAL

- Dimensions (W x H x D): 22.2 cm x 19.4 cm x 7.5 cm (8.7 in x 7.6 in x 3.0 in)
- Weight: 1.17 kg (2.57 lb)
- Ports
  - RS232 serial link, USB 2.0/UART
  - Bluetooth 2.1 + EDR
- User interface: Graphical PMOLED display

ENVIRONMENTAL

- Operating temperature: –40 °C to +65 °C (–40 °F to +149 °F)[4]
- Storage temperature: –40 °C to +85 °C (–40 °F to +185 °F)[5]
- Dust/Water: P67
- Shock/Vibration: 2 m pole drop on concrete; MIL-STD-810F

ELECTRICAL

- Dual reachargeable 2 x 7.4 V 2800 mAh Li-Ion hot-swappable batteries
- Average operating time on internal batteries 10 hours (GSM or UHF Rx on)
- Power: 9 to 28 V DC external power input

COMMUNICATIONS AND DATA STORAGE

- 2 GB internal memory (expandable via SD card)
- Over a year of 15 seconds raw GNSS data from 14 satellites
- Up to 20 Hz real-time raw data (code and carrier) and position output
- Recording Interval: 0.05–999 seconds
- WiFi: (802.11 b/g/n)
- 3.5 G quad-band GSM / penta-band UMTS module (800/850/900/1900/2100 MHz)
- Optional integrated TxRx UHF radio

Correction formats

- Supported data formats: ATOM, CMR, CMR+, RTCM 2.1, 2.3, 3.0, 3.1, 3.2 (including MSM)
- NMEA 0183 messages output

1 Accuracy and TTFF specifications may be affected by atmospheric conditions, signal multipath, satellite geometry and corrections availability and quality.
2 Performance values assume minimum of five satellites, following the procedures recommended in the product manual. High multipath areas, high PDOP values and periods of severe atmospheric conditions may degrade performance.
3 Long baselines, long occupations, precise ephemeris used.
4 At very low temperatures UHF module should not be used in the transmitter mode.
5 Without batteries. Batteries can be stored up to +70 °C.
6 Network RTK PPM values are referenced to the closest physical base station.
7 CenterPoint RTX accuracy is typically achieved within 5 minutes in select regions, and within 30 minutes worldwide.

SP60

- Extended scalability
- 240-channel 6G ASIC
- Z-Blade GNSS-centric
- Trimble® RTX services
- Internal TRx UHF radio
- Long range Bluetooth
- Anti-theft technology

The Spectra Geospatial SP60 GNSS receiver has been designed to meet the needs of surveyors or location professionals. Extremely scalable and versatile, the SP60 can be used for virtually any task from simple GIS workflows to the most demanding surveying jobs.

The SP60's Z-Blade GNSS-centric technology delivers fast and reliable GNSS positioning utilizing all available GNSS signals to produce the optimal solution even in challenging environments. GPS-only, GLONASS-only or BeiDou-only positioning modes are available when necessary.

The patented inside-the-rod antenna extends the RTK radio range as well as protects the antenna. Anti-theft technology protects your investment by making the receiver unusable if the SP60 base has been moved. Satellite delivered corrections from Trimble RTX services are available over L-band and IP. Depending on the accuracy of your job, a range of services are available including CenterPoint, RangePoint, ViewPoint and FieldPoint RTX.

For small jobs of a few hundred meters, RTK jobs can be completed quickly and efficiently by using Long range Bluetooth. Unlike UHF radios which may require a license, Long range Bluetooth is fast and easy to setup making this solution ideal for small site surveys.

With scalable configurations, the SP60 is the most versatile receiver on the market and will meet the demand of your specific jobs.

GENERAL

- 240 GNSS channels
  - GPS L1C/A, L1P(Y), L2P(Y), L2C
  - GLONASS L1C/A, L2C/A, L3
  - Beidou (Phase II) B1, B2
  - Galileo E1, E5b
  - QZSS L1C/A, L2C, L1SAIF
  - SBAS L1C/A
  - L-band
- Support for Trimble RTX correction services
- Scalable by firmware upgrade from L1 PP to full RTK
- RTK rover & base
  - UHF radio
  - Long range Bluetooth
- Anti-theft technology

TECHNICAL SPECIFICATIONS

Real-time accuracy (RMS) [1,2]

SBAS (WAAS/EGNOS/MSAS/GAGAN)

- Horizontal: < 50 cm
- Vertical: < 85 cm

Real-time DGPS position

- Horizontal: 25 cm + 1 ppm
- Vertical: 50 cm + 1 ppm

Real-time kinematic position (RTK)

- Horizontal: 8 mm + 1 ppm
- Vertical: 15 mm + 1 ppm
- 30/30
  - Horizontal: 30 cm
  - Vertical: 30 cm
- 7/2 (Firmware option needed)
  - Horizontal: 7 cm
  - Vertical: 2 cm

Trimble RTX correction services (RMS) [1,7]

- CenterPoint® RTX
  - Horizontal accuracy: 2 cm
  - Vertical accuracy: 5 cm
- FieldPoint RTX™: 10 cm (horizontal)
- RangePoint® RTX: 30 cm (horizontal)
- ViewPoint RTX™: 50 cm (horizontal)

Real-time performance

Instant-RTK initialization

- Typically 2 sec for baselines: < 20 km
- Up to: 99.9% reliability
- RTK initialization range: over 40 km

Post-processing accuracy (RMS) [1,2]

Static & fast static

- Horizontal: 3 mm + 0.5 ppm
- Vertical: 5 mm + 0.5 ppm

High-precision static [3]

- Horizontal: 3 mm + 0.1 ppm
- Vertical: 3.5 mm + 0.4 ppm

Data logging characteristics

- Recording interval: 0.1 – 999 seconds

PHYSICAL CHARACTERISTICS

- Size: 21 x 21 x 7 cm (8.3 x 8.3 x 2.3 in)
- Weight: 930 g (2.08 lb)
- User interface: Five LEDs for Power, Tracking, Bluetooth, Recording, Radio operations
- I/O interface
  - RS232 serial link
  - USB 2.0/UART, and USB OTG
  - Bluetooth 2.1 + EDR. Long range: Class 1 (19dbm)

Memory

- 256 MB internal memory NAND Flash
- Over a month of 15 second raw GNSS data from 14 satellites

Operation

- RTK rover & base
- RTK network rover: VRS, FKP, MAC
- NTRIP, Direct IP
- Post-processing
- RTX (IP and satellite)

ENVIRONMENTAL CHARACTERISTICS

- Operating temperature: -40° to +65°C / (-40° to +149°F) [4,5]
- Storage temperature: -40° to +85°C / (-40° to +185°F) [6]
- Humidity: 100% condensing
- Dust/Water: IP67 waterproof, sealed against sand and dust
- Drop: 2m pole drop on concrete
- Shock: MIL STD 810 (fig 516.5-10) (01/2000)
- Vibration: MIL-STD-810F (fig 514.5C-17) (01/2000)

POWER CHARACTERISTICS

- Li-Ion battery, 7.4 V, 2800 mAh
- Battery life time: 10 hrs (GNSS On, UHF Off)
- External DC power: 9-28 V

1 Accuracy and TTFF specifications may be affected by atmospheric conditions, signal multipath, satellite geometry and corrections availability and quality.

2 Performance values assume minimum of five satellites, following the procedures recommended in the product manual. High multipath areas, high PDOP values and periods of severe atmospheric conditions may degrade performance.

3 Long baselines, long occupations, precise ephemeris used

4 At very high temperatures UHF module should not be used in the transmitter mode. With UHF transmitter on radiating 2 W of RF power, the operating temperature is limited to + 55 °C (+131 °F).

5 Without batteries. Batteries can be stored up to +70 °C.

6 Receiver convergence time varies based on GNSS constellation health, level of multipath, and proximity to obstructions such as large trees and buildings.

7 CenterPoint RTX accuracy is typically achieved within 1 minute in select regions, and within 15 minutes worldwide. FieldPoint RTX accuracy is typically achieved within 1 minute in select regions, and within 15 minutes worldwide. RangePoint RTX and ViewPoint RTX accuracy is typically achieved within 1 minute in select regions, and within 5 minutes worldwide.

SP90M

- Most versatile, modular receiver design
- Ultra-rugged design
- Patented Z-Blade technology
- 480-channel ASIC
- Dual GNSS antenna inputs
- Built-in Bluetooth, WiFi, cellular, and UHF communications
- Trimble RTX correction services

The Spectra Geospatial SP90m is a powerful, highly versatile, ultra-rugged, and reliable GNSS positioning solution for a wide variety of applications in real-time and post-processing. It also comes with a variety of integrated communications options, such as Bluetooth, WiFi, UHF radio, cellular modem, and two MSS L-band channels to receive Trimble RTX correction services.

The modular form factor of the SP90m allows for a maximum in flexibility on how the receiver can be used, such as base station, continuously operating reference station (CORS), RTK or Trimble RTX rover, on-board machine integration, vessels, etc. The ultra-rugged design of the aluminum receiver housing protects the investment, especially in tough field environments.

The state-of-the-art and patented Z-Blade GNSS-centric technology uses allavailable GNSS signals to deliver fast and reliable positions in realtime. Besides supporting all currently available and future planned GNSS satellite signals, theSP90m GNSS receiver allows the connection of two GNSS antennas for precise heading determination without the need for a secondary GNSS receiver.

GENERAL

- 480 GNSS tracking channels for multi constellation GNSS support
- Patented Z-Blade technology for optimal GNSS performance
- RTK base and rovers modes, postprocessing mode
- Two GNSS antenna inputs
- Moving base, heading and roll/pitch
- Wide range of communication features
- Support for Trimble RTX™ real-time correction services

TECHNICAL SPECIFICATIONS

Postprocessing accuracy (RMS)[1,2]

Static, Fast Static
- Horizontal: 3 mm (0.009 ft) + 0.5 ppm
- Vertical: 5 mm (0.016 ft) + 0.5 ppm

High-precision static[3]
- Horizontal: 3 mm (0.009 ft) + 0.1 ppm
- Vertical: 3.5 mm (0.011 ft) + 0.1 ppm

Post-Processed Kinematic
- Horizontal: 8 mm (0.026 ft) + 0.5 ppm
- Vertical: 20 mm (0.065 ft) + 1.0 ppm

Real-time accuracy (RMS)[1,2]

Real-Time DGPS Position
- Horizontal: 25 cm (0.82 ft) + 1 ppm
- Vertical: 50 cm (1.64 ft) + 1 ppm

Real-Time Kinematic Position (RTK)
- Horizontal: 8 mm (0.026 ft) + 1 ppm
- Vertical: 15 mm (0.049 ft) + 1 ppm

Network RTK[4]
- Horizontal: 8 mm (0.026 ft) + 0.5 ppm
- Vertical: 15 mm (0.049 ft) + 0.5 ppm

Instant-RTK® initialization
- Typically 2-second initialization for baselines < 20 km
- Up to 99.9% reliability
- RTK initialization range: > 40 km

MEASUREMENTS

Z-Blade technology for optimal GNSS performance
- GNSS-centric processing algorithm fully independent GNSS satellites tracking and processing[5]
- Quick signal detection engines for fast acquisition and re-acquisition of GNSS signals
- Advanced multi-path mitigation
- Fast and stable RTK solution even in harsh environments

Satellite signals tracked simultaneously
- GPS L1 C/A, L1P (Y), L2P (Y), L2C, L5, L1C
- GLONASS L1 C/A, L1P, L2 C/A, L2P, L3,
- L1/L2 CDMA
- GALILEO E1, E5a, E5b
- BeiDou B1, B2, B36
- QZSS L1 C/A, L1 SAIF, L1C, L2C, L5
- IRNSS L5
- SBAS L1 C/A, L5

PHYSICAL AND ELECTRICAL CHACTERISTICS

- Size: 6.5 x 20.6 x 6.5 cm (6.5 x 8.1 x 2.6 in)
- Weight: GNSS receiver 1.66 kg (3.66 lb) without UHF
- Battery life
  - 4 hrs (RTK Base, GNSS On, UHF Tx On), 12.8 W average power consumption
  - 6 hrs (RTK Rover, GNSS On, UHF Rx On), 5.9 W average power consumption
  - Li-ion battery, 27.8 Wh (7.4 V x 3.7 Ah). Acts as a UPS in case of a power source outage
  - 9-36 V DC input (EN2282, ISO7637-2)
  - External DC power limits feature

ENVIRONMENTAL CHARACTERISTICS

- Operating temperature[7]: 40° to +65°C8 (-40° to +149°F)
- Storage temperature[9]: 40° to +95°C (-40° to +203°F)
- Humidity: Damp heat 100% humidity +40°C (+104°F), IEC 60945:2002
- Water/Dust: IP67 (waterproof and dustproof), IEC 60529
- Drop: 1 m drop on concrete
- Shock: MIL STD 810F (fig. 516.5-10)(01/2000), Sawtooth (40g / 11ms)
- Vibration: MIL-STD 810F (fig 514.5C-17)(01/2000)

COMMUNICATIONS AND DATA STORAGE

- Internal UHF modules: Pacific Crest Tx/Rx (both base and rover)
- External UHF transceiver modules: Pacific Crest Tx/Rx
- Built-in 3.5 G modem
  - Quad-band GSM: (850/900/1800/1900 MHz)
  - Penta-band UMTS: (800/850/900/1900/2100 MHz)
- Memory
  - 8 GB internal memory
  - Memory is expandable through external USB sticks or hard drives
- Up to 50 Hz raw data and position output
- Recording interval: 0.02–999 seconds[10]
- Formats
  - Reference Inputs/Outputs: RTCM 3.2, RTCM 3.1/3.0/2.3/2.1, CMR/CMR+/CMRx 5, ATOM
  - RTK Networks Supported: VRS, FKP, MAC
  - NTRIP protocol
  - Navigation Outputs: NMEA-0183, ATOM

1 Accuracy and TTFF specifications may be affected by atmospheric conditions, signal multipath and satellite geometry.

2 Performance values assume minimum of five satellites, following the procedures recommended in the user guide. High multipath areas, high PDOP values and periods of severe atmospheric conditions may degrade performance.

3 Depending on baselines, precise ephemeris and long occupations up to 24 hrs may be required to achieve the high precision static specifications.

4 Network RTK PPM values are referenced to the closest physical base station.

5 All available GNSS signals are processed equally and combined without preference to any particular constellation for optimal performance in harsh environments.

6 Product is designed to fully support BeiDou B3 signals as soon as the officially published signal Interface Control Documentation (ICD) becomes available.

7 Function of the configuration is:
–– Charging mode with internal battery at +45°C (+113°F) max.
–– Discharge mode with internal battery at +60°C (+140°F)
–– Without internal battery (external power supply) at +65°C (+149°F) under conditions of installation.
At very high temperature, the UHF module should not be used in transmitter mode. With the UHF transmitter
on radiating 2 W of RF power, the operating temperature is limited to +55°C (+131°F).

8 At this temperature, hand protection may be needed to safely handle the system's lower aluminum housing (as per EN60945).

9 Without battery. Battery can be stored up to +70°C (+158°F).

10 A Recording Interval of 0.05 is based on a 20 Hz output. The default changes to 0.02 if the optional 50 Hz output firmware option is installed.

FOCUS 35

- 1", 2", 3", and 5" angle accuracy
- Survey Pro™ or Layout Pro field software
- GeoLock™ GNSS assist technology
- StepDrive™ motion technology
- LockNGo™ advanced tracking technology
- PIN code security locking system
- Ultra lightweight at only 5 kg (11 lb)
- 2.4 GHz interference-free radio
- Ranger 7 data collector optional
- FOCUS 35 RX extended operation models feature market-leading 12 hour battery life

The powerful Spectra Geospatial FOCUS® 35 Total Station is a fully robotic motorized solution provides improved speed, accuracy and precision in measurement. A robotic instrument moves the power of the observer from the instrument to the range pole, improving the productivity of your work.

All robotic instruments include:

- A motorized drive system at the instrument
- A tracking sensor to track the range pole and prism
- A communication connection between the instrument and range pole and prism

The speed of observation and precise positioning of the FOCUS 35 robotic total station is provided by patented StepDrive motion technology. Included in all models, the StepDrive motors control the horizontal and vertical motion, so there is no need for traditional motion locks. Using the motorized drives it is possible to precisely turn to, and repeat, angle measurements. This results in quick and reliable measurements which substantially increases your staking productivity.

The Robotic, RX and LockNGo FOCUS 35 models include a tracking sensor that uses LockNGo tracking technology enabling the instrument to constantly lock onto a passive prism. The benefit of LockNGo is the ability to follow the prism at all times and reduce downtime from not having to re-point the instrument on every observation without the need for expensive battery powered prisms.

To maintain contact between the FOCUS 35 instrument and the remote observer with the range pole and prism, the robotic solution must include a communication link. The FOCUS 35 Robotic and RX uses an integrated 2.4 GHz radio modem, as does the Ranger 7 data collector. The 2.4 GHz radio modem provides interference-free robotic data communications.

Once your robotic communications have been established you can control all the functions of the FOCUS 35 from the range pole as you move through the jobsite making measurements. This makes it possible for a single surveyor to perform high accuracy stakeout or topographic surveys by themselves. From high order control surveys to topographic data collection or fast-paced construction stakeout, you can rely on a FOCUS 35, even in harsh outdoor conditions.

The FOCUS 35 total station is combined with Survey Pro field software to provide you with world class software solutions for any surveying situation. An example of these features includes GeoLock, a unique robotic software technology that keeps the total station locked on target even after line of sight interruptions. It works by combining the FOCUS 35 with Survey Pro software and a low-cost GNSS receiver to easily locate the prism after an interruption. GeoLock also works with the GNSS receiver built in to Ranger 7 data collector. Using FOCUS 35 paired with Survey Pro facilitates survey workflows to minimize downtime.

The GeoLock technique allows a robotic total station to perform an aided search for an optical target using an initial GNSS position. The remote instrument can then be directed towards the robotic roving operator using the GNSS position and a subsequent search is quickly performed to re-acquire the target at the robotic rover. This technique greatly reduces wasted time, improving your field work efficiency.

Layout Pro software and the FOCUS 35 together offer the convenience of carrying, managing, editing, and laying out your job site blueprint. This combination is a critical tool in the field of construction layout and is designed to make the layout process more productive, accurate and reliable. For example, use Layout Pro to guide the layout of the major points, add string dimensions on the print, as well as calculate diagonals and angles.

The FOCUS 35 robotic solution is best described as Simply More Powerful. Packaged in a modern, sleek, and streamlined design, it is easy-to-use, affordable and tough. FOCUS 35 Total Stations are designed to meet all your surveying needs.

Model Overview	StepDrive motion	LockNGo tracking	GeoLock	2.4GHz radio	Onboard data collection
Robotic	✔	✔	✔	✔	✔
RX	✔	✔	✔	✔	
LockNGo	✔	✔			✔
StepDrive	✔				✔

FOCUS 35

PERFORMANCE

Angle measurement

Accuracy[1] (standard deviation based on ISO 17123-3)

- 1": (0.3 mgon)
- 2": (0.6 mgon)
- 3": (1.0 mgon)
- 5": (1.5 mgon)

Angle reading (least count display)

- Standard: 1" (0.3 mgon)
- 1" model: 0.5" (0.15 mgon)
- Tracking: 2" (0.5 mgon)

Distance measurement[2]

Accuracy to Prism (standard deviation based on ISO 17123-4)

- Standard: 2 mm + 2 ppm (0.007 ft + 2 ppm)
- 1" model: 1 mm + 2 ppm (0.003 ft + 2 ppm)
- Tracking: 5 mm + 2 ppm (0.016 ft + 2 ppm)

Accuracy Reflectorless mode

- Standard < 300 m (984 ft) 3 mm + 2 ppm (0.01 ft + 2 ppm)
- Standard > 300 m (984 ft) 5 mm + 2 ppm (0.016 ft + 2 ppm)
- Tracking: 10 mm + 2 ppm (0.033 ft + 2 ppm)

Measuring time

- Prism standard: 2.4 sec.
- Prism tracking: 0.5 sec.
- Reflectorless standard: 3–15 sec.
- Reflectorless tracking: 0.7 sec.

Range Prism mode

- 1 prism: 4,000 m (13,123 ft)
- 3 prisms: 7,000 m (22,966 ft)
- Foil Reflector 60 mm: 300 m (984 ft)

Power Reflectorless Mode

	Good[4]	Normal[5]	Difficult[6]
KGC[3] (18%)	400 m (1,312 ft)	350 m (1,148ft)	300 m (984 ft)
KGC (90%)	800 m (2,625 ft)	600 m (1,969 ft)	400 m (1,312 ft)
Foil Reflector	1,000 m (3,280 ft)	1,000 m (3,280 ft)	800 m (2,625 ft)

- Shortest possible range: 1.5 m (4.9 ft)

Automatic level compensator

- Type: Dual-axis
- Accuracy: 0.5" (0.15 mgon)
- Working range: ± 5.5' (± 100 mgon)

EDM SPECIFICATIONS

EDM laser and principle

- Light sourceLaser: Diode 660 nm
- Principle: Phase Shift

EDM Beam divergence

- Horizontal: 4 cm/100 m (0.13 ft/328 ft)
- Vertical: 3 cm/100 m (0.10 ft/328 ft)
- Atmospheric correction: –150 ppm to 160 ppm continuously

CERTIFICATION

- Class B Part 15 FCC certification, CE Mark approval. C-Tick.
- Laser safety: IEC 60825-1 am2:2007
- Prism Mode: Class 1
- Reflectorless/Laser Pointer: Class 3R laser
- Bluetooth type approvals are country specific.

ROBOTIC SPECIFICATION

Robotic operation[2]

- Maximum robotic range: 300 m to 800 m (984 ft to 2,625 ft)
- Point precision at 200 m (656 ft): <2 mm (0.007 ft)
- Maximum search distance: 300 m to 800 m (984 ft to 2,625 ft)
- Search time (typical): 2–10 sec.

Communications

- Internal/external: 2.4 GHz, frequency hopping, spread spectrum

GNSS Search GeoLock[8]

- GNSS Search GeoLock™: 360° (400 gon)
- Range: Full robotic operation range

GENERAL SPECIFICATIONS

Coarse leveling

- Electronic coarse leveling range: ±3° (±3.3 gon)
- Circular level in tribrach: 8'/2 mm (8'/0.007 ft)

Drives

- Drive system: Spectra Geospatial StepDrive™ system
- Rotation speed maximum: 90°/sec (100 gon/sec)
- Rotation time Face 1 to Face 2: 3.7 sec.
- Positioning speed 180° (200 gon): 3.5 sec.
- Clamps and slow motions: StepDrive driven, endless fine adjustment

Centering

- Centering system: 3-pin
- Plummet: Built-in optical plummet
- Magnification: 2.4 x
- Focusing distance: 0.5 m to ∞ (1.6 ft to ∞)

Telescope

- Magnification: 31x
- Aperture: 50 mm (1.96 in)
- Field of view: 1°30'
- Focusing distance: 1.5 m to ∞ (4.9 ft to ∞)
- Illuminated crosshair: Standard
- Tracklight built-in: Standard
- Trunnion axis height: 196 mm (7.71 in)

Environmental

- Operating temperature: -20 °C to +50 °C (–4 °F to +122 °F)
- Dust and water proofing: IP55

Power supply[7]

- Internal battery: Li-Ion, 10.8V / 6.5Ah
- Operating time with one internal battery: Approx. 6 hours
- Models with two internal batteries: Approx. 12 hours

Communications

- External foot connector: USB cable connection and external power supply
- Wireless communication: Bluetooth®

Weight

- Instrument: 5.0 kg (11.0 lb)
- Tribrach: 0.7 kg (1.54 lb)
- Internal battery: 0.3 kg (0.66 lb)

DATA COLLECTION

Control units fixed on alidade

Face 1 (models with onboard data collection)

- Display: 3.5" TFT color touch-screen, 320x240 Pixel, backlight
- Keyboard: Alphanumeric keypad
- Memory (data storage): 128 MB RAM, 1 GB Flash
- Field application software: Survey Pro and Layout Pro

Face 2

- Display: 6 lines, monochrome, 96x49 pixel, backlight
- Keyboard: 4 keys
- Instrument software functions: Change Face, Radio and Instrument Settings, Measurement Value Display, Leveling

1 RX models are not available in 1" accuracy.
2 Standard clear: No haze, overcast or moderate sunlight with very light heat shimmer. Range and accuracy are dependent on atmospheric conditions, size of prism and background radiation.
3 Kodak Gray Card, Catalog number E1527795.
4 Good conditions (good visibility, overcast, twilight, underground, low ambient light)
5 Normal conditions (normal visibility, object in the shadow, moderate ambient light).
6 Difficult conditions (haze, object in direct sunlight, high ambient light).
7 RX models have two internal batteries.
8 GeoLock is available on data collectors after station setup.

FOCUS 2

- 2", and 5" accuracies
- Long battery life
- Fast, accurate distance measurement
- Dual face displays
- Powerful and practical onboard software
- Bi-directional data transfer software for the PC

The FOCUS 2 Series total stations are highly affordable, mechanical total stations delivering versatility, ease-of-use and feature-packed onboard software to provide unmatched performance and productivity.

Available in both 2" and 5" angle accuracies with accurate long range distance measurement, large, easy to read graphic display and powerful and practical onboard software, the FOCUS 2 Series offers the versatility to accommodate a wide array of survey and construction applications.

The FOCUS 2 Series is an economical choice that uses established technology for optimal workflow efficiencies. With convenience and reliability as a cornerstone, the FOCUS 2 is an ideal choice for value.

All FOCUS 2 models support a wide range of communication options, including SD Card, USB and serial port for convenient transfer of data.

DISTANCE MEASUREMENT

Range with specified prisms[1]

- Single Prism: 2.5m to 4,000m (8.2 ft to 13,123 ft)
- Reflectorless[2]: 500 m (1,640 ft)
- Shortest possible range: 1.0 m (3.3 ft)

Accuracy (Precise mode) ISO 17123-4

- Prism: ±(2+2 ppm x D) mm
- Reflectorless[5] : ±(3+2 ppm x D) mm

Measuring interval[3]

- Fine: 0.3 sec.
- Normal: 0.2 sec.

ANGLE MEASUREMENT

Accuracy (ISO17123-3)

- Horizontal: 2"/0.6 mgon
- Vertical: 5"/1.5 mgon
- Reading system: Absolute encoder
- Circle diameter: 79 mm (3.1 in)
- Horizontal/Vertical angle: Diametrical

Minimum increment

- Degree: 1/5"
- Gon: 0.2/1 mgon
- MIL6400: 0.005/0.02 mil

GENERAL SPECIFICATIONS

Level vials

- Sensitivity of Circular level vial: 8'/2 mm
- Sensitivity of Plate level: 30"/2mm

Optical plummet

- Image: Erect
- Magnification: 3x
- Field of view: 5°
- Focusing range: 0.3 m to ∞ (1.0 ft to ∞)

Display face 1 and face 2

- Backlit, graphic LCD, 160 x 90 pixels

Point memory

- 10,000 records

Dimensions

- W x D x H: 160mm x 150mm x 340mm (6.3 in x 5.9 in x 13.4 in)
- Weight (approx.): 5.1 kg (11.3 lb)
- Battery: 0.2 kg (0.5 lb)
- Carrying case: 3.2 kg (7.0 lb)

TELESCOPE

- Tube length: 154 mm (6.0 in.)
- Image: Erect
- Magnification: 30X
- Effective diameter of objective: 45 mm (1.8 in)
- EDM diameter: 50 mm (2.0 in)
- Field of view: 1°30'
- Resolving power: 3"
- Minimum focusing distance: 1.0 m (3.3 ft)
- Laser pointer: Coaxial Red Light

TILT SENSOR

- Type: Dual-axis
- Method: Liquid-electric detection
- Compensation range: ±3.0'

COMMUNICATIONS

- Communication ports: 1 x serial (RS-232C)
- Data Interface: SD Card, Mini-USB

POWER

Internal Ni-MH battery (x2)

- Output voltage: 6.0 V DC
- Operating time[4]: approx. 13 hours
- Charging time to full charge: 4 hours

ENVIRONMENTAL CHARACTERISTICS

Operating temperature range

- -20 °C to +50 °C (-4 °F to +122 °F)

Atmospheric correction

- Temperature range: -40 °C to +60 °C (-40 °F to +140 °F)
- Barometric pressure range: 400 mmHg to 999 mmHg (533 hPa to 1,332 hPa), (15.8 inHg to 39.3 inHg)

Dust and water protection

- IP55

1 Good conditions (good visibility, overcast, twilight, underground, low ambient light).
2 Measuring distance may vary depending on targets and measuring conditions.
3 Measuring time may vary depending on measuring distance and conditions. For the initial measurement, it may take a few more seconds.
4 Battery life specification at 25 °C (77 °F). Operation time maybe shorter in low temperatures or if the battery is not new.
5 Accuracy for 1.0 m to 5.0 m (3.3 ft to 16.4 ft) is ±8 mm

This product is only available in selected markets.

NIKON XF

- Autofocus
- Dual color touchscreen displays
- Trimble Locate2Protect ready
- PIN security
- 1", 2", 3", and 5" accuracies
- Hot swappable batteries
- Fast, powerful EDM

The Nikon XF mechanical total station is packed with new features that make survey work easier and faster, including an 800m range non-prism EDM, time-saving autofocus and dual full displays. With the Nikon XF, fieldwork is always accurate and efficient thanks to proven workflows and an array of features, including:

- New autofocus powered by Nikon that delivers quick, precise focus.
- Dual color touch screens, which allow Survey Basic, Survey Pro, and Layout Pro to run onboard.
- Superior Nikon optics for crisp, bright sightings even in low light conditions.
- Trimble L2P ready, for easy, effective asset management, so you always know where your assets are.

In the field, the Nikon XF reduces the need for downtime thanks to hot swappable batteries. The lightweight, compact design makes the total station easy to store, transport and handle. The Nikon optics deliver crisp, bright images, reducing eye fatigue. The Nikon XF is durable too–standing up to the toughest worksite conditions. Surveyors all over the globe rely on the Nikon XF to deliver exceptional results, wherever their work takes them.

DISTANCE MEASUREMENT

- Range with specified prisms
  - Good conditions[1]
    - With reflector sheet 5 cm x 5 cm (2 in x 2 in) 1.5 m to 300 m (4.9 ft to 984 ft)
  - With single prism 6.25 cm (2.5 in) 1.5 m to 5000 m (4.9 ft to 16404 ft)
- Non-Prism mode
  - KGC (18%)
    - Good[1]: 400m (1312 ft)
    - Normal[2]: 300 m (984 ft)
    - Difficult[3]: 235 m (771 ft)
  - KGC (90%)
    - Good[1]: 800 m (2625 ft)
    - Normal[2]: 500 m (1640 ft)
    - Difficult[3]: 250 m (820 ft)
- Accuracy in precise mode[7]
  - Prism[6]: ±(2+2 ppm x D) mm
  - Non-Prism: ±(3+2 ppm x D) mm
- Measuring interval[4]
  - Prism and Non-Prism mode
    - Precise mode: 1.0 sec.
    - Normal mode: 0.5 sec.
    - Fast mode: 0.3 sec.

ANGLE MEASUREMENT

- Accuracy (Standard Deviation based on ISO 17123-3)
  - 1": (0.3 mgon)
  - 2": (0.6 mgon)
  - 3": (1.0 mgon)
  - 5": (1.5 mgon)
- Reading system: Absolute encoder
- Circle diameter: 62 mm (2.4 in)
- Horizontal/Vertical angle: Diametrical/ Single

TELESCOPE

- Tube length: 125 mm (4.9 in)
- Image: Erect
- Magnification: 30x (19x/38x with optional eyepieces)
- Effective diameter of objective: 45 mm (1.77in)
  - EDM Diameter: 50 mm (1.97 in)
- Field of view: 1°25'
- Resolving power: 3"
- Minimum focusing distance: 1.5 m (4.9 ft)
- Tracklight: Yes
- Reticle Illumination: Yes, 4 steps

TILT SENSOR

- Type: Erect
- Method: Liquid-electric detection
- Compensation range: ±3'

COMMUNICATIONS

- Communication ports: 1 x serial (RS-232C), 2x USB (host and client)
- Wireless Communications: Integrated Bluetooth (Class 1, Long Range)

POWER

- Internal: Li–ion battery (x2)
- Operating time
  - Continuous angle-only measurement: 14 h
  - Distance and angle measurement every 30s with Autofocus: 12 h
  - Continuous distance and angle measurement: 7 h
- Charging time
  - Full charge: 6 h

GENERAL SPECIFICATIONS

- Autofocus: Yes
- Tangent Clamps: Yes
- Level vials
  - Sensitivity of Circular level vial on tribrach: 10'/2 mm
- Display face 1: LCD back-lit (640 x 480 pixel)
- Display face 2: LCD back-lit (640 x 480 pixel)
- Operating system: Windows Embedded Compact 7
- Processor: Dual Core 800MHz
- Memory: 512 MB RAM, 4 GB Flash Memory
- Internal Plummet: Optical or Class 2 Laser
  - Optical Plummet
    - Magnification: 3x
    - Field of view: 5°
    - Minimum focusing distance: 0.5m
- Dimensions (W x D x H): 206 mm x 169 mm x 318 mm (8.1 in x 6.7 in x 12.5 in)
- Weight (approx.)
  - Main unit: 4.3 kg (9.5 lb)
  - Battery: 0.1 kg (0.2 lb)
  - Carrying case: 3.3 kg (7.3 lb)

ENVIRONMENTAL

- Operating temperature range: –20 °C to +50 °C (–4 °F to +122 °F)
- Storage temperature range: –25 °C to +60 °C (–22 °F to +140 °F)
- Atmospheric correction
  - Temperature range: –40 °C to +60 °C (–40 °F to +140 °F)
  - Barometric pressure range: 400 mmHg to 999 mmHg / 533 hPa to 1,332 hPa / 15.8 inHg to 39.3 inHg
- Dust and water protection: IP66

CERTIFICATION

- Class B Part 15 FCC certification, CE Mark approval. RCM Mark.
- IEC60825-1 am 2007, IEC60825-1 am 2014, FDA notice 50
- Prism/Non-prism mode: Class 1 laser
- Laser Plummet/Laser Pointer: Class 2 laser

1 Good conditions (good visibility, overcast, twilight, low ambient light).
2 Normal conditions (normal visibility, object in the shadow, moderate ambient light).
3 Difficult conditions (haze, object in direct sunlight, high ambient light).
4 Measuring time may vary depending on measuring distance and conditions. Specification based on average of repeated measurements.
5 Battery life specification at 25 °C (77 °F). Operation times may vary depending on the condition and deterioration of the battery.
6 Standard Deviation based on ISO 17123-4
7 For both prism and non-prism modes, EDM accuracy in normal mode is ±(10+5 ppm x D) mm and fast mode is ±(20+5 ppm x D) mm.

Bluetooth type approvals are country specific.
Specifications subject to change without notice.

autofocus powered by Nikon

Nikon

NIKON XS

- Autofocus
- Dual-face displays
- Fast, powerful EDM
- PIN security
- 1", 2", 3", and 5" accuracies
- Nikon onboard software
- Hot swappable batteries

With its lightweight, compact design and easy setup, the Nikon XS mechanical total station makes survey work fast, efficient and easy. Its onboard software ensures smooth, efficient workflows from the field to the office. When you work with the Nikon XS, you get the work done right the first time. There's no need to return to the job site, thanks to features that include:

- Hot swappable batteries that have the power to last all day, and then some.
- Superior Nikon optics and autofocus for crisp, bright sightings even in low light conditions.
- A full range of accuracies to ensure you have exactly the equipment you need for the work you do.
- PIN security to prevent unauthorized use.
- 800m non-prism EDM

The Nikon XS is user-friendly and durable. Its light weight and portability reduces user fatigue, allowing for long work days, even as it handles tough worksite conditions. Most important: It's highly accurate and backed by Nikon quality assurance. You can rely on it to make precise measurements, project after project, year after year.

DISTANCE MEASUREMENT

- Range with specified prisms
  - Good conditions[1]
    - With reflector sheet 5 cm x 5 cm (2 in x 2 in) 1.5 m to 300 m (4.9 ft to 984 ft)
  - With single prism 6.25 cm (2.5 in) 1.5 m to 5000 m (4.9 ft to 16404 ft)
- Non-Prism mode
  - KGC (18%)
    - Good[1]: 400m (1312 ft)
    - Normal[2]: 300 m (984 ft)
    - Difficult[3]: 235 m (771 ft)
  - KGC (90%)
    - Good[1]: 800 m (2625 ft)
    - Normal[2]: 500 m (1640 ft)
    - Difficult3: 250 m (820 ft)
- Accuracy in precise mode[7]
  - Prism[6]: ±(2+2 ppm x D) mm
  - Non-Prism: ±(3+2 ppm x D) mm
- Measuring interval[4]
  - Prism mode
    - Precise mode: 1.0 sec.
    - Normal mode: 0.5 sec.
    - Fast mode: 0.3 sec.
  - Non-Prism mode
    - Precise mode: 1.0 sec.
    - Normal mode: 0.5 sec.
    - Fast mode: 0.3 sec.
  - Least count
    - Precise mode: 1 mm (0.002 ft)
    - Normal mode: 10mm (0.02ft)
    - Fast mode: 10mm (0.02ft)

ANGLE MEASUREMENT

- Accuracy
  - (Standard Deviation based on ISO 17123-3): 1", 2", 3", 5"
- Reading system: Absolute encoder
- Circle diameter: 62 mm (2.4 in)
- Horizontal/Vertical angle: Diametrical / Single
- Minimum increment (Degree, Gon):
  - Degree: 1" (XS 1": 0.5"); Gon: 0.1 mgon

TELESCOPE

- Tube length: 125 mm (4.9 in)
- Image: Erect
- Magnification: 30x (19x/38x with optional eyepieces)
- Effective diameter of objective: 45 mm (1.77in)
  - EDM Diameter: 50 mm (1.97 in)
- Field of view: 1°25'
- Resolving power: 3"
- Minimum focusing distance: 1.5 m (4.9 ft)

TILT SENSOR

- Type: Dual axis
- Method: Liquid-electric detection
- Compensation range: ±3'

COMMUNICATIONS

- Communication ports: 1 x serial (RS-232C), 1x USB (host)
- Wireless Communications: Integrated Bluetooth

POWER

- Internal: Li-ion battery (x2)
- Output voltage: 3.6V
- Operating time
  - Continuous angle-only measurement: 22 h
  - Distance/ angle measurement/ AF every 30 s: 18 h
  - Continuous distance/ angle measurement: 10 h
- Charging time
  - Full charge: 6 h

GENERAL SPECIFICATIONS

- Autofocus: Yes
- Tangent Clamps: Yes
- Level vials
  - Sensitivity of Circular level vial on tribrach: 10'/2 mm
- Display face 1: back-lit, graphic LCD (128 x 64 pixels)
- Display face 2: back-lit, graphic LCD (128 x 64 pixels)
- Point memory: 50,000 points
- Internal Plummet: Optical or Class 2 Laser
  - Optical Plummet
    - Magnification: 3x
    - Field of view: 5°
    - Minimum focusing distance: 0.5m
- Dimensions (W x D x H): 206 mm x 169 mm x 318 mm (8.1 in x 6.7 in x 12.5 in)
- Weight (approx.)
  - Main unit: 4.3 kg (9.5 lb)
  - Battery: 0.1 kg (0.2 lb)
  - Carrying case: 3.3 kg (7.3 lb)

ENVIRONMENTAL

- Operating temperature range: –20 °C to +50 °C (–4 °F to +122 °F)
- Storage temperature range: –25 °C to +60 °C (–22 °F to +140 °F)
- Atmospheric correction
  - Temperature range: –40 °C to +60 °C (–40 °F to +140 °F)
  - Barometric pressure range: 400 mmHg to 999 mmHg / 533 hPa to 1,332 hPa / 15.8 inHg to 39.3 inHg
- Dust and water protection: IP66

CERTIFICATION

- Class B Part 15 FCC certification, CE Mark approval. RCM Mark.
- IEC60825-1 am 2007, IEC60825-1 am 2014, FDA notice 50
- Prism/Non-prism mode: Class 1 laser
- Laser Plummet/Laser Pointer: Class 2 laser

1 Good conditions (good visibility, overcast, twilight, low ambient light).
2 Normal conditions (normal visibility, object in the shadow, moderate ambient light).
3 Difficult conditions (haze, object in direct sunlight, high ambient light).
4 Measuring time may vary depending on measuring distance and conditions. Specification based on average of repeated measurements.
5 Battery life specification at 25 °C (77 °F). Operation times may vary depending on the condition and deterioration of the battery.
6 Standard Deviation based on ISO 17123-4
7 For both prism and non-prism modes, EDM accuracy in normal mode is ±(10+5 ppm x D) mm and fast mode is ±(20+5 ppm x D) mm.

Bluetooth type approvals are country specific.
Specifications subject to change without notice.

autofocus powered by Nikon

Nikon

NIKON NPL-322+

- 2" and 5" angle accuracies
- Reflectorless and prism-only models
- Fast, accurate EDM
- Legendary Nikon optics
- Convenient and long-lasting Li-ion battery
- 50,000 point onboard storage
- Dual axis compensation
- Bluetooth enabled

The NPL-322+ Total Stations deliver an economic, versatile, and easy-to-use platform to ensure you get the job done right. Nikon's legendary optics effectively allow in more light to give you brighter, clearer images. You'll see the difference when you look through a Nikon Total Station even in the low-visibility conditions typical in the field.

You'll see much more detail and much less distortion, especially over longer distances. Better optics help you aim more precisely, and they're much easier on your eyes - something you'll really appreciate on long workdays.

Using the same rechargeable long life Li-ion battery as the Nivo series, combined with low power consumption design, the NPL-322+ provides the longest possible time in the field. For convenience, the Nikon NPL-322+ total stations include two batteries and a dual charger, to support even the longest of working days.

The Nikon NPL-322+ Series of mechanical total stations include 2" and 5" accuracies, reflectorless and prism-only models. All four NPL-322+ models feature dual axis compensation to correct for errors in tilt in the horizontal and vertical axes, wireless Bluetooth connections to external data collectors and 50,000 point onboard storage. All models have a 3,000 m (9,840 ft) range to a single prism, with reflectorless models additionally having a 400 m (1,300 ft) non-prism range.

The Nikon NPL-322+ is built tough for all occasions.

DISTANCE MEASUREMENT

- Range with specified prisms
  - Good conditions (No haze, visibility over 40 km (25 miles))
    - Reflectorless[1]: 1 1.5 m to 400 m (4.9 ft to 1,312 ft)
    - With single prism 6.25 cm (2.5In)[6]: 6.25 cm (2.5 in)[6] 1.5m to 3,000 m (4.9ft to 9,842 ft)
  - Normal (Ordinary haze, visibility approx. 20 km (12.4 miles) to Difficult conditions)
    - Reflectorless[1]: 1 1.5 m to 350 m (4.9 ft to 1148 ft)
    - With single prism: 6.25 cm (2.5 in)[6] 1.5m to 3,000 m (4.9ft to 9,842 ft)
- Accuracy
  - Prism/Precise mode[2,3]: ± (2+2 ppm x D) mm
  - Reflectorless/Precise mode[6]: ±(3+3 ppm x D) mm
- Measuring interval[4]
  - Prism mode
    - Precise mode: 1.1 sec.
    - Normal mode: 0.8 sec.
  - Reflectorless mode[6]
    - Precise mode: 1.2 sec.
    - Normal mode: 1.0 sec.
  - Least count
    - Precise mode: 1 mm (0.002 ft)
    - Normal mode: 10 mm (0.02 ft)
- Accuracy in precise mode[7]
  - Prism[6]: ±(2+2 ppm x D) mm
  - Non-Prism: ±(3+2 ppm x D) mm

ANGLE MEASUREMENT

- ISO 17123-3 accuracy (horizontal and vertical): 2"/0.6 mgon, 5"/1.5 mgon
- Circle diameter: 88 mm (3.46 in)
- Horizontal angle: 2":Diametrical, 5":Single
- Vertical angle: Single
- Minimum increment (Degree, Gon, MIL6400): Degree: 1/5/10", Gon: 0.2/1/2 mgon, MIL6400: 0.005/0.02/0.05 mil

TELESCOPE

- Magnification: 30x (18x/36x with optionall eyepieces)

TILT SENSOR

- Type: Dual axis

COMMUNICATIONS

- Communication ports: 1 x serial (RS-232C)
- Wireless Communications: Integrated Bluetooth

POWER

- Clip-on rechargeable battery system: Li-ion Battery (x2 incl.)
- Operating time per battery[5]: approx. 11 hours (distance/angle measurement every 30 s.)

GENERAL SPECIFICATIONS

- Level vials
  - Sensitivity of Plate level vial: 30"/2 mm
  - Sensitivity of Circular level vial: 10'/2 mm
- Optical plummet
  - Magnification: 3x
  - Focusing range: 0.5 m to ∞ (1.6 ft to ∞)
- Display: 2": Dual face, graphic LCD (128 × 64 pixel), 5": Single face, graphic LCD (128 × 64 pixel)
- Point memory: 50,000 records
- Dimensions (W x D x H): 168 mm x 173 mm x 335 mm (6.6 in x 6.8 in x 13.1 in)
- Weight
  - Main unit (without battery): 4.9 kg (10.8 lb)
  - Battery / Carry case: 0.1 kg (0.2 lb) / 2.5kg (5.5lb)

ENVIRONMENTAL

- Ambient temperature range: –40 °C to +60 °C (–40 °F to +140 °F)
- Atmospheric correction
  - Temperature range: –40 °C to +55 °C (–40 °F to +131 °F)
  - Barometric pressure range: 400 mmHg to 999 mmHg / 533 hPa to 1,332 hPa/15.8 inHg to 39.3 inHg
- Dust and water protection: IP55

CERTIFICATION

- Class B Part 15 FCC certification, CE Mark approval. RCM Mark.

1 KGC 90%
2 ±(3+3ppmxD)mm –20°Cto–10°C,+40°Cto+50°C (–4 °F to +14 °F, +104 °F to +122 °F).
3 Standard deviation based on ISO 17123-4
4 Measuring time may vary depending on measuring distance and conditions.
5 Battery life specification at 25 °C (77 °F).
6 NPL-322+ 2"P and NPL-322+ 5"P models feature prism only measurements.

THEODOLITES

- 5", 7" and 10" accuracies available
- Four models to choose from: NE-100/101/102/103
- Accurate, affordable, easy-to-use
- Ergonomic keypad
- One-touch function keys
- Large, backlit LCD display
- NE-100/101 models are water-resistant
- NE-102/103 models are waterproof

Designed for general construction and survey applications, Nikon NE-100 Series electronic digital theodolites give you accurate measurements in an affordable, easy-to-use platform. Each of the four models has an ergonomic keypad with one-touch keys for all functions, and a large backlit LCD display helps you work productively in the field.

You can instantly convert vertical angles to percent of grade, reset the horizontal angle to zero and lock the horizontal angle displayed on the LCD while you reposition or repeat a measurement. Angle accuracies differ between the models.

The NE-100 offers 10" angle accuracy, while the NE-101 offers 7". Both the NE-102 and 103 models offer 5" angle accuracy with the NE-103 featuring vertical axis compensation. NE-102 and NE-103 also have a rear display and keypad.

NE-100 series theodolites feature five easy-to-use, one-touch keys: four to perform all common functions and a fifth to control the backlit LCD display and reticle illumination. NE-100 Series theodolites feature a built-in reticle illuminator and backlit LCD display that allow you to work inside buildings as well as in tunnels, mines and other environments with little or no light

These features also come in handy during low light conditions outdoors, such as near dawn or dusk.

Unlike other instruments that require specialized batteries, NE-100 Series theodolites use six standard AA batteries. What's more, those batteries can power all models for about 48 hours.

A three-level bar graph on the LCD screen displays remaining battery power.

With the Nikon NE-100 Series theodolite models, you can count on reliable performance in tough conditions. The NE-100/101 models have an IP54 rating, meaning water can splash on them from any direction with no harmful effects. Nikon NE-102/103 models have a higher rating of IP56 which means they're waterproof and dustproof.

THEODOLITES

	NE-100	NE-101	NE102	NE-103
ANGLE MEASUREMENT				
Reading system	photoelectric incremental encoder	photoelectric incremental encoder	photoelectric incremental encoder	photoelectric incremental encoder
Circle diameter	79 mm (3.1 in)	79 mm (3.1 in)	79 mm (3.1 in)	79 mm (3.1 in)
Unit of reading	degree/gon/mil	degree/gon/mil	degree/gon/mil	degree/gon/mil
Minimum digital reading	10/20", 2/5 mgon, 0.05/0.1 mil	5/10", 1/2 mgon, 0.02/0.05 mil	5/10", 1/2 mgon, 0.02/0.05 mil	5/10", 1/2 mgon, 0.02/0.05 mil
Accuracy (DIN 18723)	10"/3 mgon	7"/2 mgon	5"/1 mgon	5"/1 mgon
TELESCOPE				
Effective diameter of objective	45 mm (1.8 in)	45 mm (1.8 in)	45 mm (1.8 in)	45 mm (1.8 in)
Magnification	30x	30x	30x	30x
Image	erect	erect	erect	erect
Field of view	1°20' (2.3 m @ 100 m/2.3 ft @ 100 ft)	1°20' (2.3 m @ 100 m/2.3 ft @ 100 ft)	1°20' (2.3 m @ 100 m/2.3 ft @ 100 ft)	1°20' (2.3 m @ 100 m/2.3 ft @ 100 ft)
Minimum focusing distance	0.7 m (2.3 ft)	0.7 m (2.3 ft)	0.7 m (2.3 ft)	0.7 m (2.3 ft)
Stadia multiplier constant	100	100	100	100
Stadia additive constant	0	0	0	0
Reticle illuminator	yes	yes	yes	yes
AUTOMATIC VERTICAL COMPENSATOR				
Type	-	-	-	liquid-electric detection
Working range	-	-	-	±3' (out-of-range warning provided)
DISPLAY/KEYPAD				
Front				
Type	dot-matrix LCD (20 characters x 2 lines)	dot-matrix LCD (20 characters x 2 lines)	dot-matrix LCD (20 characters x 2 lines)	dot-matrix LCD (20 characters x 2 lines)
Backlight	1-level illumination	1-level illumination	1-level illumination	1-level illumination
Keypad	5 buttons	5 buttons	5 buttons	5 buttons

	NE-100	NE-101	NE102	NE-103
Rear				
Type	-	-	dot-matrix LCD (20 characters x 2 lines)	dot-matrix LCD (20 characters x 2 lines)
Backlight	-	-	1-level illumination	1-level illumination
Keypad	-	-	5 buttons	5 buttons
OPTICAL PLUMMET				
Magnification	2.2x	2.2x	3x	3x
Field of view	5°	5°	5°	5°
Focus range	1.3 m (4.3 ft) fixed	1.3 m (4.3 ft) fixed	0.5 m (1.6 ft) to infinity	0.5 m (1.6 ft) to infinity
LEVEL SENSITIVITY				
Plate level	60"/2 mm 40"/2 mm 30"/2 mm	-	-	-
Circular level	10'/2 mm	10'/2 mm	10'/2 mm	10'/2 mm
Leveling base type	detachable	detachable	detachable	detachable
Ambient temperature range	–20 to 50 C (–4 TO 122 °F)	–20 to 50 C (–4 TO 122 °F)	–20 to 50 C (–4 TO 122 °F)	–20 to 50 C (–4 TO 122 °F)
Enviornmental rate	IP54	IP54	IP56	IP56
Dimensions instrument	153.5 x 172 x 334 mm (6.0 x 6.8 x 13.1 in)	153.5 x 172 x 334 mm (6.0 x 6.8 x 13.1 in)	153.5 x 172 x 334 mm (6.0 x 6.8 x 13.1 in)	153.5 x 172 x 334 mm (6.0 x 6.8 x 13.1 in)
WEIGHT				
Instrument	4.5 kg (9.8 lb)	4.5 kg (9.8 lb)	4.6 kg (10.1 lb)	4.6 kg (10.1 lb)
Carrying case	2.5 kg (5.4 lb)	2.5 kg (5.4 lb)	2.5 kg (5.4 lb)	2.5 kg (5.4 lb)
POWER SUPPLY				
Battery type	1.5 V AA x 6	1.5 V AA x 6	1.5 V AA x 6	1.5 V AA x 6
Continuous operating time (at 68 °F/20 °C)	48 hours	48 hours	48 hours	48 hours

AP/AC/AX

- Three models to choose from: AP-8/ AC-2S/AX-2S
- Compact and lightweight
- Water-resistant construction
- Magnetic-dampened automatic compensator
- Horizontal tangent knobs with unlimited range
- Smooth, precise pointing and angular measurement
- Detachable eyepiece lens

AP/AC/AX Series auto levels are easy to set up and use. All three models can attach to both flat and spherical-head tripods. Horizontal tangent knobs with an unlimited range ensure smooth, precise pointing and angular measurement, and you can operate them with either hand. The detachable eyepiece lens lets you use an optional diagonal eyepiece prism for working in extremely close or steep quarters.

Nikon optics effectively let in more light, so you see brighter, sharper images-especially in low-light conditions. The AP-8 model auto level features a 28x high-magnification telescope, the AC-2S has a 24x telescope, and the AX-2S has a 20x telescope. All three models offer minimum focusing down to 2.46 ft (0.75 m) for better performance in tight spots or on steep slopes.

	AP-8	AC-2S	AX-2S
TELESCOPE			
Tube length	190 mm (7.5 In)	190 mm (7.5 In)	190 mm (7.5 In)
Image	erect	erect	erect
Magnification	28x	24x	20x
Effective diameter of objective lens	30 mm (1.2 In)	30 mm (1.2 In)	30 mm (1.2 In)
Field of view	1°30' (2.6ft @ 100 ft)	1°30' (2.6ft @ 100 ft)	1°30' (2.6ft @ 100 ft)
Minimum focusing distance	.75 m (2.46 ft)	.75 m (2.46 ft)	.75 m (2.46 ft)
Stadia ratio	1 :100	1 :100	1 :100
Stadia additive constant	0	0	0
LEVEL VIAL SENSITIVITY			
Circular level	10'/2 mm	10'/2 mm	10'/2 mm
STANDARD DEVIATION (1 KM DOUBLE-RUN LEVELING)			
Without micrometer	±1.5 mm	±2.0 mm	±2.5 mm
AUTOMATIC COMPENSATOR			
Type	wire-hung, magnetic hamper	wire-hung, magnetic hamper	wire-hung, magnetic hamper
Compensation Range	±16'	±16'	±16'
Setting accuracy	±0.5"	±0.5"	±0.5"
HORIZONTAL CIRCLE			
Diameter of circle	110 mm (4.3 in)	110 mm (4.3 in)	110 mm (4.3 in)
Minimum increment	1°/1 g	1°/1 g	1°/1 g
Reading estimation	0.1°/0.1g	0.1°/0.1g	0.1°/0.1g
DIMENSIONS			
Instrument (L x H x W)	190 x 128 x 123 mm (7.5 x 5.0 x 4.8 in)	190 x 128 x 123 mm (7.5 x 5.0 x 4.8 in)	190 x 128 x 123 mm (7.5 x 5.0 x 4.8 in)
Carrying case	292 x 170 x 163 mm (11.5 x 6.7 x 6.4 in)	292 x 170 x 163 mm (11.5 x 6.7 x 6.4 in)	292 x 170 x 163 mm (11.5 x 6.7 x 6.4 in)
WEIGHT			
Instrument	1.3 kg (2.9 lb)	1.3 kg (2.9 lb)	1.3 kg (2.9 lb)
Carrying case	0.9 kg (2.0 lb)	0.9 kg (2.0 lb)	0.9 kg (2.0 lb)

AS/AE

- Four models to choose from: AS-2/2C, AE7/7C
- Compact and lightweight
- Waterproof construction
- Automatic air-dampened compensator
- Standard optical sight lens
- Powerful telescopes with
- Improved minimum focusing
- Carrying case, adjusting pins and lens cap included

Nikon AS/AE Series auto levels feature waterproof, nitrogen-filled, high-power telescopes that help you make precise measurements even in the wettest conditions. They feature a unique automatic air-dampened compensator to prevent magnetic interference, and an endless horizontal fine drive to ensure smooth, precise pointing and angular measurement. AS/AE Series auto levels are easy to set up and easy-to-use. All four models can attach to both flat and spherical-head tripods, and the standard optical sight lens helps you find your target quickly, easily and accurately. A mirror with a pentaprism lets you view the circular bubble as an erect image during setup and sighting.

	AS-2/2C	**AE-7/7C**
TELESCOPE		
Tube length	259 mm (10.2 in)	220 mm (8.7 in)
Image	erect	erect
Magnification	34x	30x
Effective diameter of objective lens	45 mm (1.8 in)	40 mm (1.6 in)
Field of view	1°20′ (2.3 ft @ 100 ft)	1°30′ (2.6 ft @ 100 ft)
Minimum focusing distance	1.0 m (3.28 ft)	0.3 m (0.98 ft)
Stadia ratio	1 :100	1 :100
Stadia additive constant	0	0
Resolution power	2.5"	3"
LEVEL VIAL SENSITIVITY		
Circular level	10′/2 mm	10′/2 mm
STANDARD DEVIATION (1 KM DOUBLE-RUN LEVELING)		
Without micrometer	±1.5 mm	±2.0 mm
With micrometer	±0.4 mm	-
AUTOMATIC COMPENSATOR		
Type	wire-hung, air damper	wire-hung, air damper
Compensation Range	±12′	±16′
Setting accuracy	±0.3"	±0.35"
HORIZONTAL CIRCLE		
Diameter of circle	80 mm (3.2 in) (AS-2C only)	118 mm (4.6 in) (AE-7C only)
Minimum increment	1°/1 g	1°/1 g
Reading estimation	1′/1 cg	0.1°/0.1 g
DIMENSIONS		
Instrument (L x H x W)	259 x 136 x 142 mm (10.2 x 5.4 x 5.6 in)	220 x 136 x 142 mm (8.7 x 5.4 x 5.6 in)
Carrying case	379 x 195 x 197 mm (14.9 x 7.7 x 7.8 in)	379 x 195 x 197 mm (14.9 x 7.7 x 7.8 in)
WEIGHT		
Instrument	1.8 kg (4.0 lb)/1.9 kg (4.2 lb)	1.7 kg (3.7 lb)
Carrying case	1.8 kg (4.0 lb)/1.9 kg (4.2 lb)	1.8 kg (4.0 lb)/1.9 kg (4.2 lb)

FOCUS DL-15

- Consistent measurement precision
- Measure and record with a single key press
- Onboard measurement software
- Internal data storage and easy transfer

The FOCUS DL-15 digital level is a very affordable, digital level delivering simplicity, ease-of-use and versatile onboard software to provide consistent precision, performance and productivity.

FOCUS DL-15: INSTANTLY PRODUCTIVE

The FOCUS DL-15 digital level provides consistent height measurement precision through electronic reading of a standard bar code staff to an accuracy of 1.5 mm (0.005 ft.). Featuring internal data storage and a distance measurement range of 100m (328 ft.), the Spectra Geospatial digital level is affordable, versatile, and easy to use, an ideal choice for value.

POWERFUL ONBOARD SOFTWARE FUNCTIONS

- Easy to learn and use, instantly productive, the FOCUS DL-15 provides consistent measurement precision. It eliminates reading and recording errors and reduces operator eye fatigue.
- Use on a wide range and variety of tasks requiring precise height determination. It enables the user to initiate a measurement and record the data at the push of a button.
- The FOCUS DL-15 contains measurement routines for common leveling tasks including height determination, calculation of elevations, height differences and cut and fill stakeout.
- Simple data transfer from the FOCUS DL-15 via USB cable.

TECHNICAL SPECIFICATIONS

Height

- Accuracy (DIN 18723, standard deviation height measuring per 1 km (3,280.84 ft) of double leveling)
  - Electronic Measurement: 1.5 mm (0.005 ft)
  - Optical Measurement: 2.0 mm (0.007 ft)

Distance measurement

- Accuracy
  - Distance (D) ≤10 m (32.80 ft): 10 mm (0.033 ft)
  - Distance (D) >10 m (32.80 ft): D*0.001 mm/ft
- Range
  - Electronic Measurement: 1.5 m–100 m (4.92 ft–328.08 ft)

Electronic Measurement

- Resolution Height Measurement: 1 mm / 0.5 mm
- Resolution Distance Measurement: 0.1 m / 0.01 m
- Measurement Time: 3 sec.

Horizontal Circle

- Graduation: 360 degrees
- Graduation interval: 1 degree
- Estimation: 0.1 degree

Environmental

- Operating temperature: –20 °C to +50 °C (–4 °F to +122 °F)
- Dust and water proofing: IP54

GENERAL SPECIFICATIONS

Telescope

- Objective aperture: 45 mm (0.148 ft)
- Magnification: 32x
- Resolving power: 3″
- Field of view: 1°30′
- Stadia constant: 100

Compensator

- Type: Magnetic damping
- Compensation range: ±12′
- Setting accuracy: ±0.3″
- Circular level sensitivity: 8′/2 mm
- Display: Dot matrix LCD,128 x 32 dpi with illumination
- Keyboard: 16-key numeric including 4-way navigation arrows
- Onboard Programs: Elevation / Height difference / Cut & Fill stakeout /Distance stakeout / Height measurement
- Data Storage: Internal: 16 MB>100,000 points
- Point number: Increasing
- Interface: Mini-USB
- Dimensions: (L x W x H): 230 mm x 150 mm x 210 mm (9.0 in x 5.9 in x 8.3 in)
- Weight: Weight (including battery): 2.5 kg (5.5 lb)
- Power Supply
  - Internal battery (x2): Rechargeable Ni-Mh,4.8 V, 2100 mAh
  - Operating time: Approx. 20 hours
  - Charging time: Approx. 5 hours

RANGER 7

- 7" multi-touch display – Easier to see your data and operate
- Dual hot-swap batteries – Continuous power
- Windows 10 Professional operating system – OS for professionals
- Available with Survey Pro and Layout Pro software

Welcome to the fourth generation Ranger data collector. Its all-new design is based on the experience gained over the last 18 years of demanding field operations. The guiding principles have never changed: productivity, reliability, and quality. A down day is simply not an option.

The Ranger 7 continues the legacy of the Ranger data collector by focusing on what is important.

- Screen Size: It's not just about showing a bigger map; it's about seeing results and making decisions.
- Full Keyboard: It's about getting that data input quickly and error free. The backlit QWERTY keyboard and full numeric keypad are designed for just that.
- Rugged and Reliable: A down day really isn't an option. Few things are more damaging to schedules and profits than equipment that isn't ready. The Ranger 7 is designed tough. It is up to your challenge.
- Enables Productivity: The screen, keyboard, toughness, solid pole bracket, hot-swappable batteries, and industry leading field software like Survey Pro, all combined with high quality Spectra Geospatial instruments means you get the most out of your money.

PHYSICAL SPECIFICATIONS

- Size: 30 x 20.9 x 7.1 cm (11.8 x 8.2 x 2.8)
- Weight: 1.42 kg (3.12 lb)
- Housing: Glass-fibre reinforced resin with integrated drop bumpers

ENVIRONMENTAL SPECIFICATIONS

Meet or exceed

- Operating temperature: –20 °C to 60 °C (–4 °F to 140 °F) MIL-STD-810G 501.5 Procedures II (operation)
- Storage temperature: –40 °C to 70 °C (–40 °F to 158 °F) MIL-STD-810G 501.5 Procedures I (storage)
- Humidity: - 90%RH temp cycle –20 °C/60 °C (–4 °F/140 °F) MIL-STD-810G, Method 507.5, Procedure II
- Sand & dust: IP6x: 8 hours of operation with blowing talcum powder (IEC-529)
- Water: IPx8: Immersion, up to 1 m (3.2 ft) depth for 2 hours
- Drop: 26 drops at room temperature from 1.22 m (4 ft) onto plywood over concrete MIL-STD- 810G, Method 516.6, Procedure IV

SECURITY

- TPM (Trusted Platform Module)

CONFIGURATIONS

- EMPOWER module support: 2 x module bays
- Languages supported at first boot: Chinese (Simplified), English (US), French, German, Italian, Japanese, Korean, Portuguese (Brazilian), Spanish (Castilian region and Mexico)

CERTIFICATIONS

- Among others
  - FCC, NRTL, ICES, IC, NRTL, CE, CB, RCM, CCC
- Countries: Certified in countries: USA, Canada, EU, Australia/New Zealand, South Africa, India, Malaysia, Tunisia, UAE, Thailand, Taiwan, Russia
- Environmental: EU RoHS, China RoHS, REACH, WEEE

COMPATIBLE SOFTWARE

- Survey Pro and Layout Pro

ELECTRICAL SPECIFICATIONS

- Processor: Intel Apollo Lake - N4200, 64-bit quad-core
- Memory: 8 GB RAM, LPDDR4
- Storage: 64 GB eMMC
- Expansion: via microSDXC card up to 2 TB
- Batteries: 2 x 3100 mAh (22.53 Wh) min. capacity/3150 mAh (22.90 Wh) nominal capacity; removable, hot swappable, charge LED indicator
- Charging time: Full-charge 3.5 hours, fast-charge (80 %) 1 ¾ hours
- Battery life: Medium usage approx. 5 hours, can range4-7 hours (depending on display settings, connectivity, data processing, ambient temperature, etc.)
- Power input: 19V/5A charging
- Notification LED: Charging and power status
- Display: 17,78 cm (7-inch), 1280 x 800 landscape, 16:10, multi-point capacitive, 650+ nits sunlight readable
- Keyboard: QWERTY or ABCD, with backlight, numeric key block, Fn keys (6 physical + 6 2nd function Fn keys)
- Audio: Speaker and dual digital microphone array with noise reduction
- External speaker/microphone: 3.5 mm mini-jack or wireless headset
- I/O: User replacable module. Standard: Charger/DC power-in, USB 3.1 Gen 1 type A host,serial RS232 DB-9
- USB: USB 3.1 Gen 1
- WWAN: Worldwide LTE in regions where it is available, and compatible with 3G networks AT&T and Verizon certified. MicroSIM card
- Wi-Fi: 802.11 a/b/g/n, 2.4 GHz radio band
- Bluetooth®: BT 2.1 + EDR, BT 4.1
- Camera
  - Rear camera: 8 MP autofocus with flash
  - Front camera: 2 MP fixed-focus
- GNSS: Integrated GNSS Sensors: 3-axis accelerometer, magnetic sensor, ambient light sensor, proximity sensor

T41

- Rugged design with 4.3" display protected by Gorilla® Glass
- Windows Embedded Handheld 6.5 OS
- 8 megapixel camera with dual LED flash
- Bluetooth, WiFi and 3.75G cellular connectivity
- 1 GHz CPU with 512 MB RAM and 16 GB Flash storage
- Full-Day battery life
- Support for 10 languages

The Spectra Geospatial T41™ Data Collector is rugged, powerful, connected and compact, offering high performance with a high-resolution outdoor readable display. The slim, ergonomic design is easy to hold and enables all-day use. A capacitive touch-screen protected by Gorilla® Glass provides intuitive and responsive finger-tip touch capability. The T41 handheld has 3.75G cellular data capabilities for use with VRS networks, plus cellular voice and SMS capabilities. The 8-megapixel camera can be set to automatically include time and location data from the integrated GPS receiver.

ENVIRONMENTAL SPECIFICATIONS

- Water: Survives driving rain and water spray IEC-60529 IPx5, water jet 12.5 mm dia @ 2.5–3 m
- Dust: Protected against dust, IEC-60529 IP6x, dust chamber with under-pressure
- Drops: Survives multiple drops of 4 ft (1.22 m), MIL-STD-810G, Method 516.6, Procedure IV, Transit Drop
- Operating temperature: –22 °F to 144 °F (–30 °C to 60 °C), MILSTD-810G, Method 502.5, Procedure I, II, III (Low Temp Operating –30 °C); Method 501.5, Procedure I & II (High Temp Operating 60 °C)
- Storage temperature: – 40 °F to 158 °F (– 40 °C to 70 °C), MILSTD-810G, method 502.5, procedure I, II, III (Low Temp Storage – 40 °C); Method 501.5, Procedure I & II (High Temp Storage 70 °C)
- Temperature shock: Cycles between – 22 °F and 144 °F (– 30 °C and 60 °C),MIL-STD-810G, Method 503.5, Procedure I-C
- Humidity: 90% relative humidity with temperatures between 22 °F and 144 °F (30 °C and 60 °C), MIL-STD-810G, Method 507.5, Procedure II
- Altitude: 15,000 ft (4,572 m) at 73 °F (23 °C) to 40,000 ft (12,192 m) at –22 °F (–30 °C), MIL-STD-810G, Method 500.5, Procedure I, II & III
- Vibration: General minimum integrity and loose cargo tests, MILSTD-810G, Method 514.6, Procedure I & II, Category 5
- Solar exposure: Survives prolonged UVB exposure, MIL-STD-810G, Method 505.5, Procedure II
- Chemical exposure: Resistant to mild alkaline and acid cleaning solutions, fuel hydrocarbons, alcohols and common vehicle and factory machine lubricants

PHYSICAL

- Size: 15.5 cm x 8.2 cm x 2.5 cm (6.1 in x 3.2 in x .9 in)
- Weight: 13.5 oz (.4 kg), including battery

ELECTRICAL

- Processor: 1 GHz, Texas Instruments DM3730
- Memory: 512 MB
- Storage: 16 GB, non-volatile
- Expansion: MicroSD card slot, SIM card slot
- Display: 4.3 in (10.9 cm), 480 x 800 pixel, WVGA TFT
- Battery: 3.7 V, 3.3 Ah, 12.2 Wh, Lithium-ion polymer
- I/O: 3.5mm audio jack; Custom port that supports USB 2.0 host, USB client, 9-pin serial and 5.6 V (5.0 V to 5.9 V) DC input power
- GPS receiver: 2– 4 m accuracy with SBAS correction; MCX port for optional external antenna
- Radios: Bluetooth 2.1 +EDR; Wi-Fi 802.11 b/g/n
- WWAN radios: UMTS / HSPA+, GSM / GPRS/ EDGE, UMTS
- Bands (WCDMA/FDD): 800, 850, 1900, AWS and 2100 MHz
- GSM Bands: 850, 900, 1800, 1900 MHz

STANDARD ACCESSORIES

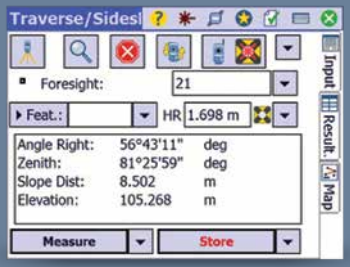
- International AC charging kit
- T41 USB cable
- Wrist strap
- Ultra clear screen protectors (qty 2) kit
- Quick Start Guide

OPTIONAL ACCESSORIES

- 9-pin serial adapter
- USB host adapter
- Capacitive stylus with tether
- External battery pack
- Port cover
- Ultra clear screen protectors (qty 10) kit
- Anti-reflective screen protectors (qty 2) kit
- Vehicle charging kit
- Capacitive touchscreen gloves
- External GPS antenna
- Support for 10 languages: English, simplified Chinese, French, German, Italian, Japanese, Korean, Portuguese, Russian and Spanish.

SURVEY PRO

- Complete Mechanical Instrument Support
- All data collection features
- Basic point stakeout
- Basic COGO including Inverses, Intersections, Manual Traverse, Area and much more
- Basic Curve Solutions



Survey Pro™ Field Software provides you with a complete set of capabilities for all your survey projects. It's fast, reliable, and easy-to-use. Transfer data from Survey Pro to your laptop or PC and manage your jobs using Survey Office software. Survey Pro software ships on Spectra Geospatial's rugged line of data collectors providing unparalleled integration, data integrity, efficiency and ease-of-use. The features and functions of Survey Pro have been developed based on feedback from surveyors like you. Each new release of this software incorporates enhancements built on your field experience.

Survey Pro software is offered in different modules so you can pick the one that works best for you today, then quickly and easily add features as you need them. You save money by getting only the software that you need for your business. As your business expands and you need more power, Survey Pro is still there for you with advanced modules readily available and easy to remotely install via electronic "unlock" codes without having to pay a premium.

Survey Pro is offered in multiple languages and on multiple data collector platforms so you can get the right tool for your business. Not only is Survey Pro easy to buy, it really is easy to use. A surveyor's job is not easy and it takes a real professional to do it well; Survey Pro makes things clear and efficient, freeing you up to do your job. The customizable home screen is just one example of how Survey Pro helps you get the job done. Survey Pro's vast COGO feature set is unmatched in its capabilities and is one of the reasons Survey Pro has been a top choice of surveyors for more than 20 years.

Survey Pro works with all Spectra Geospatial and Nikon instruments as well as multiple other manufacturers' instruments. Survey Pro is the glue that holds your business together. Of course, if you have a complete line of Spectra Geospatial and Nikon products, you'll find that Survey Pro's integration with those instruments gives you that extra power and flexibility you need to compete in today's world.

SPECTRA GEOSPATIAL CENTRAL CONNECTED

Central provides a cloud computing hub for your complete survey team to connect and exchange information anywhere there is a data connection. A cloud service is nothing more than internet accessible data storage. It's how you access and use the data that is really the important part. Central is designed for professionals who make their living outside, doing measurements, and building the world. Survey Pro is connected to Central providing you with the full power of internet cloud services.

SURVEY STANDARD

- Complete mechanical instrument support
- All data collection features
- Basic point stakeout
- Basic COGO including Inverses, intersections, manual traverse, area and much more
- Basic Curve Solutions
- All the fundamental features required to properly manage a survey job
- SURVEY PRO
- Everything that comes in Survey Standard plus:
- Advanced COGO and Curve Solutions including station offsets, average points, and spiral tools
- Advanced Stakeout including offset staking, slope staking and stake to a DTM
- Road Layout – complete road layout and staking tool set

SURVEY PRO ROBOTIC

- Everything contained in Survey Pro plus complete robotic instrument support
- Remote Control, radio configurations and automated repetitions

SURVEY PRO GNSS

- Everything contained in Survey Pro plus complete GPS/GNSS instrument support
- Extensive data collection routines with easy to use, step-by-step setup features
- Extensive support for projections and calibrations
- All GNSS staking routines are supported
- Support for RTK, network RTK, static and PPK surveys

SURVEY PRO MAX

- Combines Survey Pro Robotics and Survey Pro GNSS: complete support for all instruments and all features.

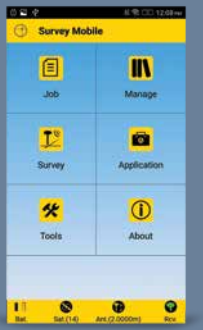
LEVELING MODULE

- Add Leveling functionality to any module of Survey Pro to add support for level loops, trigonometric leveling, and digital level drivers.

1 For a complete function list, please visit our website

SURVEY MOBILE

- Easy to learn
- Simple to use
- Common GNSS survey support
- Fast setup and survey
- Supports Android v4.3 and higher, Mechanical Total Stations, Nikon such as NPL-322/322+, DTM-322/322, Nivo M series, Focus 8 & Focus 6
- Support for the new SP20



Survey Mobile is an easy to learn and simple to use field software for surveyors who want to get their work done fast and efficiently. The user interface is designed to be simple and straightforward so surveyors can be productive immediately. Sharing data between crews is seamless with importing and exporting capabilities. Surveyors can measure, stakeout and calibrate a site in their coordinate system of choice after configuring their receiver settings. Survey Mobile currently supports the SP60 and SP80 GNSS receivers, Mechanical Total Stations, Nikon such as NPL-322/322+, DTM-322/322, Nivo M series, Focus 8 & Focus 6 and support for the new SP20.

The software is optimized for use on Android devices v4.3 and higher. Survey Mobile allows users the flexibility to use any Android supported device. The features and functionalities provided by Survey Mobile will enable surveyors to be productive and efficient in the field where every second counts.

GENERAL SURVEY
- Topological point survey, multi-epoch control point survey, offset distance point survey, Stop&Go, and fast survey with controller internal GNSS.

STATIC SURVEY
- Static survey and data logging.

STOP&GO SURVEY
- To log number of points in the same job.

STAKEOUT
- Point and line stakeout.

ROADING
- Road elements supported including importing road design files,defining road elements, defining intersections and stakeout of road stations.

SITE CALIBRATION
- Grid to local transformation.

RECEIVER CONFIGURATION
- Internal radio RTK, external radio RTK, CORS and single base network RTK.

IMPORT & EXPORT
- Job (.jxl), coordinate system (.scs), point (.txt, .csv,.dat, and.dxf), and road (.rxl) files.

DEFINE
- Topological point, control point with grid coordinates or WGS84 geodetic coordinates.

COGO
- Calculate points based on angles and distances.

LICENSING OPTIONS
- Free 30-day fully featured trial license
- Standalone license

SYSTEM VERSION
- Android v4.3 and higher

SUPPORTED LANGUAGES
- Chinese
- English
- French
- German
- Italian
- Portuguese (Brazil)
- Spanish

CENTRAL CLOUD SOLUTION

- Automatic file synchronization
- Automatic file backup
- Smart device apps for mobile connectivity
- Easy to implement and use

Central provides a cloud computing hub for your complete survey team to connect and exchange information from anywhere there is a data connection. A cloud service is nothing more than internet accessible data storage. It's how you access and use the data that is really the important part. Central is designed for professionals who make their living outside, doing measurements, and building the world. Central now also provides the Central Cloud Correction service so you can deliver your base's corrections over the internet to your rovers.

- Central Cloud Corrections, or CCC, is a service provided through Central.
- CCC enables the base receiver's corrections to be piped through the internet to the CCC server and then out to any connected RTK rovers.

THE PARTS

Web Portal

The web portal provides an easy way to edit, manage, and use your Central accounts and data. It can be accessed with any browser from your office computer, tablet, or smart phone.

Smart Phone Applications

Survey Pro Central for Android and Survey Pro Central for iOS provide access with dedicated smart phone and tablet apps. These apps provide data access and a range of functionality to help you manage your data, and therefore your workday, better.

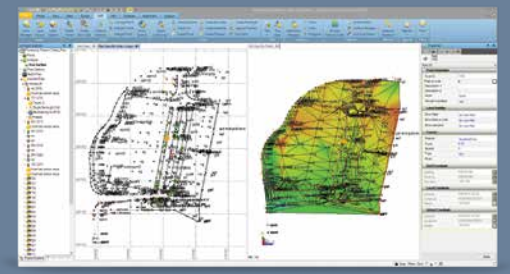
Central Sync

Central Sync is a tool that runs as a service on your computer and synchronizes data that is placed in the Central folders. This makes file management and synchronizing data with Central very easy.

Survey Pro Integration

Survey Pro is fully integrated into Central. Files are uploaded as they are created. New data is sent up to Central based on user preferences. So now, not only do Spectra Geospatial ultra-rugged data collectors and dedicated field software protect your data, so does Central, backing it up on a remote server.

SURVEY OFFICE



Survey Office is an office software package supporting comprehensive workflows for Survey, GIS, and specialist service providers creating deliverables from traditional data types or the latest aerial photogrammetry, scanning, and imagery data from terrestrial, mobile, and aerial sensors. Survey Office eliminates historically disjointed workflows, supporting the needs and flexibility of multidisciplinary businesses, and reducing costs of software purchasing and training.

Survey Office performs data reduction, computation, QA/QC, leveling editing, site calibration, traverse adjustment, and network adjustment with customized reports. Process and review RTK, static, FastStatic, and Stop-and-Go kinematic data and integrate with adjusted level loops and conventional traverses in the same project.

Surface, corridor, and volumetric workflows are fully supported which allow users to efficiently create surfaces, breaklines, boundaries, contour maps as well as modify surface triangulation. Users can also perform complex earthwork calculations as well as create cut/fill maps and exchange these with field software and other CAD packages.

Control data, point information, surface and corridor designs, or CAD linework can be exported to the Survey Pro field software for use in the field. Select all or a subset of information to be exported to a GIS or CAD third-party database or file format. Or add labels and labels to the Survey Office project and select a pre-built drafting template for plan, cross-section, or plan-andprofile sheet generation. Offers the flexibility and accessibility to customize and streamline commands with user-definable menus and ribbons, project and drafting templates, and style managers.

FLEXIBLE LICENSING OPTIONS

There is a Survey Office edition matched to your business needs with comprehensive and scalable toolsets.

Basic Edition	Intermediate Edition	Advanced Edition
The Base edition provides the tools you need to import and review field data, perform entry-level CAD- and QC-related tasks, and generate reports.	In addition to all Base edition functionality, the Intermediate edition enables you to perform full GNSS and total station adjustments and post-processing. It also supports data eduction, site-calibration, and surface creation workflows.	In addition to all Intermediate edition functionality, the Advanced edition offers the full CAD package along with plotting and corridor design support. Note: Importing data, viewing data, and exporting data to Survey Pro are unlicensed Survey Office features.

Workflow-specific modules are available to add to an Survey Office edition for increased productivity and efficiency, all in a single software package.

Aerial Photogrammetry Module	GIS Module
The Base edition provides the tools you need to import and review field data, perform entry-level CAD- and QC-related tasks, and generate reports.	In addition to all Base edition functionality, the Intermediate edition enables you to perform full GNSS and total station adjustments and post-processing. It also supports data eduction, site-calibration, and surface creation workflows.
Data Prep Module	**Scanning Module**
The Data Prep module enables you to create 2D and 3D models more effectively with extended imagery support, digitalization tools, and project clean-up tools.	The Scanning module expands your point cloud data processing capabilities with georeferencing, sampling, extraction, and image generation tools.

SYSTEM RECOMMENDATIONS

Operation System
- Microsoft Windows 7, 8, or 10 (64-bit version)

Processor
- Intel Pentium Dual-Core E2160 (1.80 Ghz, 1 mb l2 Cache, 800 fsb) or better
- Quad-core 2.80 GHz or better for Aerial Photogrammetry and Scanning Modules

Random Access Memory (RAM)
- Minimum: 2 GB or more
- 32 GB or greater for Aerial Photogrammetry and Scanning Modules

Hard Disk
- Minimum: 5 GB or more
- 100 GB or more on solid-state drive for Aerial Photogrammetry and Scanning Module

Graphics
- DirectX 11 compatible graphics card with 512 MB memory or more
- OpenGL version 3.2 or later required when working with point cloud data
- GB graphics card required when working with UAS data and/or point cloud data

Monitor and ports
- Monitor: 1280 x 1024 or higher resolution with 256 or more colors (at 96 DPI)
- I/O Ports: USB 2.0 port or higher for HASP key

Supported Languages
- Chinese Simplified
- Dutch
- English UK
- English US
- French
- German
- Italian
- Japanese
- Korean
- Portuguese (Brazilian)
- Russian
- Spanish
- Swedish

LAYOUT PRO

- Enters plans quickly and easily
- Guided and Simple Instrument Setup
- Simple Calculation Tools
- Clear and Usable map screens
- Edits Plans

Layout Pro and Layout Pro Office construction positioning solutions give contractors more control of their job sites allowing significant improvements in construction accuracy and productivity. Layout Pro works with the FOCUS 35 robotic total station and Ranger 7 data collector for extremely productive one-person layout. The Nikon XF series instrument with onboard computer with Layout Pro makes a highly productive integrated system. Or, use Layout Pro on a Ranger 7 or Ranger 3 with a Nikon XS or NPL-322+ connected via Bluetooth for layout with a handheld and mechanical total station. Add the Layout Pro Office software to your system and then you can:

- Take CAD designs and data into the field.
- Lay out complex concrete forms or anchor bolts from any location by referencing any two known points.
- Layout control points and offset hubs faster and more cost-effectively - work on your schedule.
- Layout all lines from one reference location with no string lines, transits or theodolites.
- Make minor adjustments to the building position as needed without waiting or paying subcontractor fees.
- Check the work of others and create documentation for change orders when necessary. Reflectorless measurement capabilities make as-built checks a one-person job.
- Lay out control lines for subcontractors faster and more accurately than with tapes and theodolites.
- Easily collect topographical data and import it into third-party software for elevation and cut and fill analysis.
- Import a DXF background map and use the snap features to create points right in the field.

LAYOUT PRO OFFICE

Layout Pro Office software is designed for the contractor using Layout Pro field software for their layout applications. It's the ideal companion for anyone working with large or complex drawings.

Featuring an intuitive graphical user interface, Layout Pro Office software makes it easy to create a digital replica of your construction blueprint in the office before going out on the site to do the layout. While you are still in the office, you can use simple tools to perform distance, angle, area or down-and-out computations. You can also create your construction points from AutoCAD DXF files, and upload them to the Layout Pro. No need to learn a complete engineering CAD program.

Graphical user interface provides direct access to common functions for a shorter learning curve and minimal self-training.

Standard view controls offer a common user interface designed for anyone with a limited understanding of CAD for fast, easy operation.

Multiple point selection in Individual, Window, and Current view point selection techniques give you maximum control to select points.

Enter Plan and COGO (coordinate geometry) functionality in the office.

Supports importing AutoCAD DWG and DXF files for creating layout points.

Import and export text files that contain a list of points and coordinates.

SP20

- Integrated High Accuracy GNSS
- Ergonomic Design
- Android Operating System
- Handheld accuracy

The SP20 handheld GNSS receiver combines innovative, camera enabled data collection workflow with a high level of performance in an ergonomic, scalable solution (from meter to cm accuracy). Rugged and lightweight, the SP20 is easy-to-use and highly accurate. It is the optimal tool not only for cadastral, construction, or topo surveys, but also for a range of GIS projects, including data collection, inspection and maintenance.

The 5.3-inch screen delivers vivid visuals of the workflow, which enables precise 2D handheld logging. And the system's high degree of accuracy can be enhanced with a monopole accessory to deliver solid, survey-grade 3D measurements. Whatever type of geospatial work you're performing, turn to the easy-to-use SP20 handheld that consistently delivers highly accurate results.

GNSS CHARACTERISTICS

- 240 GNSS channels
  - GPS L1C/A, L1P(Y), L2P(Y), L2C
  - GLONASS L1C/A, L2C/A
  - BeiDou B1 (phase 2), B2
  - Galileo E1, E5b
  - QZSS L1C/A, L2C, L1SAIF
  - SBAS L1C/A
  - L-band
- Scalable accuracy from meter to cm (meter, sub meter (30/30), dm (7/2), cm)
- Patented Z-Blade technology for optimal GNSS performance
  - Full utilization of signals from all 6 GNSS systems (GPS, GLONASS, BeiDou, Galileo, QZSS and SBAS)
  - Enhanced GNSS-centric algorithm fully-independent GNSS signal tracking and optimal data processing, including GPS-only GLONASS-only or BeiDou-only solution (autonomous to full RTK)
  - Fast Search engine for quick acquisition and re-acquisition of GNSS signals
- Patented SBAS ranging for using SBAS code & carrier observations and orbits in RTK Processing
- Patented Strobe™ Correlator for reduced GNSS multi-path
- Supported data formats: ATOM, CMR, CMR+, RTCM 2.1, 2.3, 3.0, 3.1 and 3.2 (including MSM), CMRx and sCMRx

REAL-TIME ACCURACY (RMS)[1,2]

SBAS (WAAS/EGNOS/MSAS/GAGAN)

- Horizontal: < 50 cm
- Vertical: < 85 cm

Real-Time DGPS position

- Horizontal: 25 cm + 1 ppm
- Vertical: 50 cm + 1 ppm

Real-Time Kinematic Position (RTK)[3]

- Horizontal: 10 mm + 1 ppm
- Vertical: 15 mm + 1 ppm

REAL-TIME PERFORMANCE

- Instant-RTK® Initialization
  - Typically 2 sec for baselines < 20 km
  - Up to 99.9% reliability
- RTK initialization range: over 40 km

POST-PROCESSING ACCURACY (RMS)[1,2]

Static & Fast Static

- Horizontal: 3 mm + 0.5 ppm
- Vertical: 5 mm + 0.5 ppm

High-Precision Static[4]

- Horizontal: 3 mm + 0.1 ppm
- Vertical: 3.5 mm + 0.4 ppm

PROCESSOR

- Qualcomm Snapdragon 410
- Quad-core
- Clock frequency: 1.2 GHz

OPERATING SYSTEM

- Android® 6.0 (Google certified)
- Languages available: Afrikaans, German, English, Spanish, French, Italian, Portuguese (Portugal and Brazil), Japanese, Korean, Simplified Chinese, Greek, Russian, Azebaijani, Czech, Danish, Lithuanian, Hungarian, Dutch, Norwegian (Bokmal), Romanian, Finnish, Swedish, Turkish, Bulgarian, Serbian (Cyrillic), Hindi, Polish
- Software package includes: Google Mobile Services, Sat-Look

MEMORY

- 2 GB SDRAM
- Storage: 16 GB (non volatile).
- MicroSDHC™ memory card: (up to 64 GB, SanDisk®, KingstonR recommended)

COMMUNICATIONS

- Cellular
  - GSM (850,900,1800,1900), GPRS, EDGE, UMTS, WCDMA (B1, B2, B5, B8), HSPA, TDSCDMA (B34, B39), LTE-FDD(B1, B3, B4, B5, B7, B8, B20), LTE-TDD (B38/B39/B40/B41)
- Wi-Fi (IEEE): 802.11 b/g/n
- Bluetooth: 4.0 dual mode
- USB: (micro B USB connector)
- NFC

INTERFACE

- USB 2.0: (micro)
- External antenna connector (TNC)
- Audio jack: 2.5 plug (CTIA/AHJ standards)

ENVIRONMENTAL CHARACTERISTICS

- Operating temperature: -20° to +60°C (-4 to 140°F)
- Storage temperature: -30° to +70°C without battery (-22 to 158°F)[5]
- Humidity: 95% non condensing
- Water & dust proof: IP67
- Free drop: 1.2 m on concrete
- Shocks: MIL STD 810 (fig 516.5-10) (01/2000
- Vibration: MIL-STD-810F (fig 514.5C-17) (01/2000)

PHYSICAL CHARACTERISTICS

- Size: 29.5 x 12 x 4.5 cm (11.6 x 4.7 x 1.8 in)
- Weight: 850 g (1.87 lb)

MULTIMEDIA & SENSORS

- Rear camera: 13 M pixels with flash light
- Front camera: 2 M pixels
- E-Compass
- G-sensor
- Speaker
- Microphone
- Light sensor

OPERATING MODES

- RTK rover: Direct IP, NTRIP (VRS,FKP,MAC networks)
- Post-processing
- Trimble RTX (IP and satellite)

FIELD SOFTWARE

- Survey Mobile
- MobileMapper Field
- or 3rd party Android applications

1 Accuracy and TTFF specifications may be affected by atmospheric conditions, signal multipath, satellite geometry and corrections availability and quality.
2 Performance values assume minimum of five satellites, following the procedures recommended in the product following the procedures recommended in the product manual. High multipath areas, high PDOP values and high PDOP values and periods of severe atmospheric conditions may degrade performance. Real time accuracies depend on SP20 accuracy option. PP accuracy obtained with ATOM files processed by Survey Office.
3 SP20 cm used with Monopole accessory
4 Long baselines, long occupations, precise ephemeris used
5 Batteries can be stored up to +70°C.
6 Receiver convergence time varies based on GNSS constellation health, level of multipath, and proximity to obstructions such as large trees and buildings.aConvergence can be improved in RAM eanbled regions. Convergence can be improved in RAM eanbled regions.

MOBILEMAPPER 50

- Compact and lightweight
- Wi-Fi only and 4G versions
- Enhanced GNSS with postprocessing
- Strong, waterproof casing - IP67
- Google Mobile Services
- Complete field and office mapping solution
- Easy-to-learn, easy-to-use field software

The MobileMapper 50 is a GIS data collector running on Android which offers state of the art smartphone capabilities combined with rugged professional quality and improved GNSS performance.

The MobileMapper 50 is very compact, lightweight and unique in being a professional grade data collector in a consumer smartphone form factor. The receiver is slim, highly rugged and very powerful (1.2 GHz quad core processor, 16GB memory and 5.3" display) and also offers Tri-constellation GNSS for accurate positioning (GPS+Galileo+GLO or GPS+Galileo+Beidou) as well as post processing.

Professional field users are strongly influenced by the consumer space and yet, at the same time, need to maximize operational efficiencies. With the MobileMapper 50 both requirements are addressed through full connectivity (depending on the version), superior accuracy, large memory and display all in a slim and compact design.

GNSS CHARACTERISTICS

- Internal antenna: 72 channels GPS L1 C/A
  - GLONASS L1 C/A
  - Galileo E1
  - Beidou B1
  - QZSS L1 C/A
  - Tri constellation system: GPS/GALILEO/ GLONASS or GPS GALILEO/Beidou
- External antenna connector
- NMEA output
- Raw data recording

ACCURACY SPECIFICATIONS

(Horizontal RMS)[1]

- Real-time SBAS: < 1.5 m typical
- Post-processed: < 80 cm typical

PROCESSOR

- Qualcomm Snapdragon 410
- Quad-core
- Clock frequency: 1.2 GHz

OPERATING SYSTEM

- Android® 6.0 (Google certified)
- Languages available: Afrikaans, German, English, Spanish, French, Italian, Portuguese (Portugal and Brazil), Japanese, Korean, Simplified Chinese, Greek, Russian, Azebaijani, Czech, Danish, Lithuanian, Hungarian, Dutch, Norwegian (Bokmal), Romanian, Finnish, Swedish, Turkish, Bulgarian, Serbian (Cyrillic), Hindi, Polish.
- Software package includes: Google Mobile Services, Sat-Look application

COMMUNICATIONS

Cellular

- GSM (850,900,1800,1900), GPRS, EDGE, UMTS, WCDMA (B1, B2, B5, B8), HSPA, TD-SCDMA (B34, B39), LTE-FDD(B1, B3, B4, B5, B7, B8, B17, B20, B28), LTE-TDD (B38/B39/ B40/B41) (not available on Wi-Fi only version)
- Wi-Fi (IEEE) 802.11 b/g/n
- Bluetooth4.0 dual mode
- USB(micro B USB connector)
- NFC (not supported in Wi-Fi only version)

STANDARD ACCESSORIES

- Lanyard
- Screen protectors (x2)
- A/C charger
- USB cable

OPTIONAL ACCESSORIES

- External magnetic GPS antenna
- Pole bracket
- High capacity battery: 4800 mAh

PHYSICAL CHARACTERISTICS

- Size: 164x82x14.6 mm (6.45x3.22x0.57 inches)
- Weight: 310 g with extended battery (278 g for Wi-Fi only version with standard battery)

User Interface Keyboard

- 2 volume keys, on/off/reset key, 2 programmable keys, standard Android touch panel buttons
- On screen keyboard

Display

- Size: 5.3" capacitive multi touch
- Resolution: 1280x720 pixels
- Brightness: 450 Cd/mÇ
- Gorilla Glass damage-resistant
- Auto rotate

MEMORY

- 2 GB SDRAM
- Storage: 16 GB (non volatile). 8 GB for Wi-Fi only version[2]
- MicroSDHC™ memory card: (up to 64 GB, SanDisk®, Kingston® recommended)

ENVIRONMENTAL CHARACTERISTICS

- Operating temperature: -20 °C to +60 °C (-4 °F to 140 °F)
- Storage temperature: -30 °C to +70 °C without battery (-22 °F to 158 °F)
- Humidity: 95% non condensing
- Water & dust proof: IP67
- Free drop: 1.2 m on concrete

POWER CHARACTERISTICS

- Battery: LiIon, 4800 mAh (3100 mAh for Wi-Fi only version)
- Battery life: > 15 hrs @ 20 ºC with GPS on[3]
- Charging time: 4 hours
- Removable battery

INTERFACE

- USB 2.0 (micro)
- External antenna connector
- Audio jack 2.5 plug (CTIA/AHJ standards)
- Pogo pin connector (Serial, USB, Power in)

MULTIMEDIA & SENSORS

- Rear camera: 13 M pixels with flash light (8 M pixels on Wi-Fi only version)
- Front camera: 2 M pixels
- E-Compass (not supported in Wi-Fi only version)
- G-sensor
- Speaker
- Microphone
- Light sensor

1 Accuracy performance achieved in good conditions (open sky) with GPS/GAL/GLO and more than 7 satellites in view (with SNR> 45 dBHz) (including 1 SBAS).
2 These are full capacity, but available memory space is lower as operating system and pre-loaded applications take part of the memory.
3 With high capacity battery, backlight on at 70% brightness, and all wireless off.

SPECTRA GEOSPATIAL
ACCESSORIES

SP80 & SP60 ACCESSORIES

POWER SUPPLY
- Charger, power supply and cord
- Battery
- Office power kit
- Field power kit

SOFTWARE
- Survey Office

CABLES
- USB cable
- Cable for ADL Vantage (Pro) UHF radio

MISCELLANEOUS
- 2W TRx UHF radio
- Fiberglass 2 m range pole
- Extension pole
- Transport hard case and bags

SP90M ACCESSORIES

GNSS ANTENNAS
- SPGA Rover antenna
- Choke Ring antenna

POWER SUPPLY
- Charger, power supply and cord
- Battery
- Office power kit
- Field power kit

SOFTWARE
- Survey Office

CABLES
- 1.6m and 10m GNSS antenna cables
- USB cable (OTG)
- Cable for ADL Vantage (Pro) UHF radio

MISCELLANEOUS
- UHF radio antenna
- Bluetooth / WiFi antenna
- Transport hard case and bags

FOCUS 35 ACCESSORIES

POWER SUPPLY
- Charger: dual battery
- Battery: Li-Ion 11.1V

CABLES
- Cable 1.5 m data download

MISCELLANEOUS
- Transport case
- Tribrach

GENERAL ACCESSORIES
PRISMS AND POLES

PRISM SYSTEMS
- Mini prism system: Complete tilting mini prism assembly
- Premier prism system: Waterproof canister type prism
- Prism system: Waterproof canister type prism
- Stakeout prism assembly (25 mm): On-board level vials top and bottom

POLES AND ACCESSORIES
- Prism poles: Prism pole, 2.6 m (8.5 ft)
- Compression lock: Prism pole, 2.6 m (8.5 ft)
- TLV Lock: Prism pole, 3.7 m (12 ft)
- Compression lock: Prism pole, 4 m (13 ft)
- TLV Lock

ACCESSORIES FOR PRISM POLES
- Bipod, thumb release

RANGE POLES
- 2.0 m Aluminum range pole
- 2.0 m Carbon fiber range pole
- 2.0 m Carbon fiber snap-lock range pole

REFLECTOR SHEET TARGETS
- Reflector sheet target: 0 mm offset, built-in level bubble
- Adapter for reflector sheet target: For mounting reflector sheet target on prism pole

TRIPODS
- Wooden, heavy duty, round head tripod
- Aluminum, heavy duty, quick clamp tripod
- Advanced fiberglass composite, heavy duty Tri-Max tripod

NIKON
ACCESSORIES

TOTAL STATION ACCESSORIES

DATA TRANSFER CABLES

- RS232C: Cable TS to PC (9 pin) Connects Nikon Total Station serial port to PC serial port
- RS232C: Cable TS to PC(USB) Connects Nikon Total Station serial port to USB port
- Mini USB Cable: Connects Nikon Total Station USB port to PC USB port

POWER SUPPLIES

XF, XS, & NPL-322+ Series

- Li-ion battery
- Dual battery charger
- AC adapter for battery charger
- 12V Vehicle Charger for Li-Ion Batteries

PRISMS AND EYEPIECES

Diagonal Eyepiece Prism (Erect Image)

- For telescope (black body)
- Solar Filter (52 mm) Objective
- Low-Power Eyepiece Lens
  - 19x with XS, XF
  - 18x with NPL-322+ Series
- High-Power Eyepiece Lens
  - 38x with XS, XF
  - 36x with NPL-322+ Series
- Tubular Compass & Adapter
- Lens Cap (Plastic snap-on)
- Traverse Prism Kit

INSTRUMENT CASES

- Plastic case for XS/XF total stations
- Plastic case for NPL-322+ Series

TRIPODS, RANGE POLES, AND TRIBRACHS

TRIPODS

- Wooden, Heavy Duty, Round Head Tripod
- Aluminum, Heavy Duty, Quick Clamp Tripod
- Advanced Fiberglass Composite, Heavy Duty
- Tri-Max Tripod

RANGE POLES

- 2 m Aluminum Range Pole
- 2 m Carbon Fiber Range Pole
- 2 m Carbon Fiber Snap-Lock Range Pole
- 2.6 m Telescopic Range Pole

TRIBRACHS

- Tribrach Type W30S: White, no optical plummet, circular level
- Tribrach Type W30Sb: Black, no optical plummet, circular level

ELECTRONIC THEODOLITE ACCESSORIES

PRISMS AND EYEPIECES

- Diagonal Eyepiece Prism (Erect Image)
  - Used for steep sighting, plumbing and when using the instrument in confined areas For Main Telescope of Theodolite NE-100 Series
- Low-Power Eyepiece Lens
  - 18x when attached to NE-100 Series
- High-Power Eyepiece Lens
  - 36x when attached to NE-100 Series Theodolite
- Tubular Compass & Adapter

INSTRUMENT CASES

- Plastic Instrument Case for NE-100/101/102/103

AUTOMATIC LEVEL ACCESSORIES

PRISMS AND EYEPIECES

- Optical Micrometer in Meters for AS Series
- Diagonal Eyepiece Prism (Erect Image)
- Low-Power Eyepiece Lens
  - 22x when attached to AS-2/AS-2C
  - 19x when attached to AE-7/AE-7C
  - 17x when attached to AC-2S
- High-Power Eyepiece Lens
  - 43x when attached to AS-2/AS-2C
  - 37x when attached to AE-7/AE-7C
  - 35x when attached to AC-2S

PACIFIC CREST ADL VANTAGE / ADL VANTAGE 35

RTK NETWORK ROVER: VRS, FKP, MAC

- Configurable transmit power
- Multi-function user interface
- Heavy-duty construction
- Fully water and dustproof
- 19200 over-the-air link rate without range degradation
- Advanced 40 MHz bandwidth
- Software-derived channel bandwidth

The ADL Vantage and ADL Vantage 35 are advanced, high speed, high power, wireless data links built to survive the rigors of GNSS/RTK surveying and precise positioning.

These sophisticated radio modems utilize Pacific Crest's latest Advanced Data Link (ADL) technology while remaining backward compatible with existing Pacific Crest and other radios. Their full-function user interface streamlines field configuration and troubleshooting so you can maintain maximum productivity. For the most rugged and reliable long-range data link, go with the Geomatics industry's new standard in wireless communications.

COMMUNICATION

- User interface: 1 RS-232 port, 115.2 kbps maximum
- 5 navigation buttons with LCD display LCD display can be set to display English, Cyrillic or Chinese characters

POWER

ADL Vantage

- External: 9.0 – 30.0 VDC, 2 Amp maximum
- During RX: 0.6 Watts nominal @ 12.0 VDC
- During TX: 7 Watts nominal @ 12.0 VDC, 1 W RF output 13.4 Watts nominal @ 12.0 VDC, 4 W RF output

ADL Vantage 35

- External: 11-16 VDC, 15 Amp maximum
- During RX: 1.7 Watts nominal @ 12.0 VDC
- During TX: 115 Watts nominal @ 12.0 VDC, 35W RF output 45 Watts nominal @ 12.0 VDC, 8W RF output 25 Watts nominal @ 12.0 VDC, 2W RF output

MODEM

Link rate/modulation

- 19,200 bps/4FSK
- 9600 bps/4FSK
- 19,200 bps/GMSK
- 16000 bps/GMSK
- 9600 bps/GMSK
- 8000 bps/GMSK
- 4800 bps/GMSK
- Link protocols: Transparent FST™, Transparent EOT/EOC, Packet-switched, TRIMMARK™, TRIMTALK™, TT450S (HW), SATEL®, South
- Forward Error Correction: yes

RADIO

- ADL Vantage: 390-430 MHz, 430-470 MHz
- ADL Vantage 35: 390-430 MHz, 430-473 MHz
- Frequency control: Synthesized 6.25 kHz tuning resolution
- Frequency stability: ± 1 ppm @ –40°C to +85°C
- Channel bandwidth: 12.5 kHz and 25 kHz, software derived

RF Transmitter Output

- ADL Vantage: Programmable to 0.1 – 4 Watts (where permitted)
- ADL Vantage 35: Programmable to 2 – 35 Watts (where permitted)
- Sensitivity: –110 dBm BER 10-5
- Type certification: All models are type-accepted and certified for operation in the U.S., Canada, Europe, Australia and New Zealand (and Model ADL35-2 in Brazil)

ENVIRONMENTAL

- Enclosure: IP67 (watertight for 30 minutes at 1 meter)

Operating temperature (receiving)

- ADL Vantage: -25° to +85° C (-13° to +185° F)
- ADL Vantage 35: -30°C to +65°C (-22°F to +149°F)

Operating temperature (transmitting)

- ADL Vantage: -25° to +65° C (-13° to +149° F)
- ADL Vantage 35: -30°C to +65°C (-22°F to +149°F)

Storage temperature

- ADL Vantage: -55° to +85° C (-67° to +185° F)
- ADL Vantage 35: - 30°C to +85°C (-22°F to +185°F)
- Vibration: MIL-STD-810F

MECHANICAL

Dimensions

- ADL Vantage: 8.9 cm L x 4.6 cm W x 16.0 cm H (3.5" L x 1.8" W x 6.3" H)
- ADL Vantage 35: 11.9 cm L x 8.6 cm W x 21.3 cm H 4.7" L x 3.4" W x 8.4" H (with handle)

Weight

- ADL Vantage: 705 grams (1.55 lb)
- ADL Vantage 35: 1.95 kg (4.3 lb)
- Data/Power connector: 5-pin, #1-shell LEMO-style
- RF connector: 50 Ohm, TNC female

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Specifications subjects to change without notice.

Contact your local dealer:

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