



SURVEY AND CONSTRUCTION
PRODUCT CATALOG

A photograph of the Earth from space, showing the curvature of the planet and the atmosphere. A bright sun is rising over the horizon, creating a lens flare effect and illuminating the scene. The sky is a deep blue, and the Earth's surface is a lighter blue with some white clouds.

Simply Powerful.

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- StepDrive™ motion technology
- LockNGo tracking technology
- Featuring Spectra Precision® Survey Pro™ software on-board
- Three Robotic models
2", 3" and 5" accuracies
- Long-range, reflectorless
distance measurement
- High-precision prism
measurements
- GeoLock™ GPS-assist
technology

Introducing the powerful Spectra Precision® FOCUS® 30 Total Station. The FOCUS 30 fully robotic motorized solution provides the same usability as a mechanical total station, but with 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 quality of your work.

All robotic instruments require:

- 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 30 robotic total station is provided by patented StepDrive motion technology. StepDrive controls the horizontal and vertical motion of the motors, 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.

Each FOCUS 30 model includes a tracking sensor that uses LockNGo tracking technology enabling the instrument to constantly lock onto the 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.

To maintain contact between the FOCUS 30 instrument and the remote observer with the range pole and prism, the robotic solution must include a communication link. The FOCUS 30 uses an integrated 2.4 GHz radio modem, as does the Spectra Precision Ranger™ 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 30 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 30, even in harsh outdoor conditions.

The FOCUS 30 total station is combined with Spectra Precision Survey Pro field software, providing you with world class software solutions for any surveying situation. An example of these features includes a unique robotic software technology that can be used when associating the FOCUS 30 with a low-cost GPS receiver and Survey Pro software. This combination of technologies allows the user to take full advantage of the Spectra Precision GeoLock GPS-assist technology to keep locked on target.

The Spectra Precision GeoLock field software technique allows a robotic total station to perform an aided search for an optical target using an initial GPS position. The remote instrument can then be directed towards the robotic roving operator using the GPS 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.

The FOCUS 30 robotic solution is best described as Simply Powerful. Packaged in a modern, sleek, and streamlined design, it is easy-to-use, affordable and tough.

FOCUS 30 Total Stations are designed to meet all your surveying needs.

PERFORMANCE

Angle measurement

Accuracy (Standard deviation based on ISO 17123-3)

2" (0.6 mgon), 3" (1.0 mgon), or 5" (1.5 mgon)

Angle reading (least count)

Standard

1" (0.1 mgon)

Tracking

2" (0.5 mgon)

Distance measurement¹

Accuracy to Prisms (Standard deviation based on ISO 17123-4)

Standard

2 mm + 2 ppm (0.007 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)

Range Reflectorless Mode

Difficult⁴, Normal⁵, Good⁶

KGC (18%)

300 m, 350 m, 400 m

(980 ft, 1,150 ft, 1,310 ft)

KGC (90%)

400 m, 600 m, 800 m

(1,310 ft, 1,970 ft, 2,620 ft)

Shortest possible range

1.5 m (4.9 ft)

Automatic level compensator

Type

Dual-axis

Accuracy

0.5" (0.15 mgon)

Working Range

±6' (±111 mgon)

EDM SPECIFICATIONS

EDM Laser and Principle

Light source

Laser 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 SURVEYING

Robotic Operation¹

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

GPS Search GeoLock³

GPS 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 Precision 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

Internal battery

Li-Ion, 11.1 V/4.4 Ah

Operating time with one internal battery

Approx. 6 hours

Communications

External foot connector

USB cable connection and external

power supply

Wireless communication

Bluetooth®

Weight

Instrument

5.0 kg (12.1 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

Display

3.5" TFT color touch-screen, 320x240 Pixel,

backlight

Keyboard

Alphanumeric keypad

Memory (data storage)

128 MB RAM, 128 MB Flash

Field Application Software

Spectra Precision Survey 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 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.

² Kodak Gray Card, Catalog number E1527795.

³ Spectra Precision GeoLock is available on data collectors after station setup.

⁴ Difficult conditions (haze, object in direct sunlight, high ambient light).

⁵ Normal conditions (normal visibility, object in the shadow, moderate ambient light).

⁶ Good conditions (good visibility, overcast, twilight, underground, low ambient light).



- Affordable GPS + GLONASS integrated receiver
- Integrated Bluetooth and Interface Control Panel
- RTK real-time positions, static, and PPK
- Network RTK positioning
- Comprehensive Spectra Precision Survey Pro application software
- Support for all GNSS data with Spectra Precision Survey Office software

The Spectra Precision® EPOCH® 35 GNSS System uses highly accurate Global Positioning System (GPS) and GLONASS technology for cadastral, topographic, control, stakeout and other precision survey applications. Combining both these satellite services provides the user with the greatest possible satellite coverage. This allows observations in areas where only one satellite solution would not provide results.

The EPOCH 35 is a complete GNSS system that includes a base, rover, field software, data collector, and radio modem. The EPOCH 35 GNSS receiver features integrated Bluetooth capability, and an internal, field replaceable battery. The rover includes an internal radio modem. The system runs Spectra Precision Survey Pro software. This premiere field software operates on the Spectra Precision Ranger, Nomad™ and Recon® data collectors.

With fast, reliable initialization, the EPOCH 35 GNSS system is a measurement solution that provides high-quality results in several survey modes including RTK, Static, and PPK. The system operates without line-of-sight between points, and can be used in any weather. Designed as a multi-purpose tool the EPOCH 35 GNSS system provides total flexibility. Built especially for surveyors, the compact and lightweight EPOCH 35 GNSS system integrates the user control interface panel into one powerful measurement solution.

For RTK surveying, the base system may include a choice of radio modems that provide either a high or low power data link from the base to the rover. In addition, Network RTK is also supported by simply connecting to an external data capable cellular modem or by using a data collector with integrated WAN. Back at the office, surveyors can use the Spectra Precision Office software for postprocessing and quality control.

GENERAL

When connected to the data collector

- GPS & GLONASS (GNSS) RTK dual frequency with centimeter accuracy
- Ergonomic, light weight and compact design
- Integrated Wireless Bluetooth 2.0 technology
- Application programs, job, and data management
- Access Network RTK with GPRS

TECHNICAL SPECIFICATIONS

Static GNSS surveying¹

- Horizontal
±5 mm +0.5 ppm RMS
- Vertical
±5 mm +1 ppm RMS

Real-Time surveying¹

- Horizontal
±10 mm + 1 ppm RMS
- Vertical
±20 mm + 1 ppm RMS

Initialization

Automatic OTF (on-the-fly) while moving

Initialization time

Typically <30 seconds

Start-up

<60 seconds from power on to positioning
<30 seconds with recent ephemeris

Code differential GPS positioning¹

WAAS/EGNOS differential positioning accuracy

Typically <5 m 3DRMS²

Measurements

- Low elevation satellite tracking technology
- 72 channels
14 L1, 14 L2 GPS, 12 L1, 12 L2 GLONASS, 2 SBAS, WAAS/EGNOS, 18 reserved
- NMEA-0183: L2/L2C, AVR, GSV, HDT, VGK, VHD, ROT, GGG, GGA, GSA, ZDA, VTG, GST, PJT, and PJK
- 5 Hz RTK position rate

Physical

Dimensions (W×H×D)

- GPS receiver
19.0 cm x 7.0 cm x 20.0 cm
(7.48 in x 2.76 in x 7.87 in)

Weight

- Base 1.0 kg (2.2 lb)
- Rover 1.1 kg (2.4 lb), internal radio, UHF antenna

Ports

- I/O Two 7-pin Lemo, RS-232
- Data Link antenna TNC (Rover only)
- Storage SD Card Slot 512 MB/1 GB⁴

ENVIRONMENTAL

Operating temperature

–20 °C to +65 °C (–4 °F to +149 °F)

Storage temperature

–40 °C to +75 °C (–40 °F to +167 °F)

Humidity

95%, condensing

Water/Dust

IP64

Shock and vibration: Tested and meets the following environmental standards:

Shock UNE EN 60068-2-27:1993

Vibration MIL-STD-810F Fig 514.5C-1

ELECTRICAL

- Power 10 V DC to 15 V DC external power input with over-voltage protection on Port 1 and Port 2 (7-pin)
- Rechargeable, 7.4v 2400 mAh Li-Ion internal battery
- Power consumption is <2.5 W, in RTK mode with internal radio
- Average operating times on internal battery:
– RTK/Static: 5.5 hours³

COMMUNICATIONS AND DATA STORAGE

- Raw GNSS data storage on a 512 MB industrial grade removable SD Card RTCM 2.1, 2.2, 2.3, 3.0, CMR
- Supports external GSM/GPRS/CDMA modems for point to point RTK
- Supports external and integrated Nomad 800X GPRS modems for NTRIP operations
- Supports external UHF transmit data link for RTK base station operation – CMR, RTCM 2.1, RTCM 2.2, RTCM 2.3, RTCM 3.0
- EPOCH 35 with integrated internal UHF receive only data link
– CMR, RTCM 2.3, RTCM 3.0, RTCM 3.1 RTK
– 410 – 430 MHz, 430 – 450 MHz, 450 – 470 MHz
– 25 KHz Channel spacing
– 12.5 KHz Channel spacing

¹ Accuracy and reliability may be subject to anomalies such as multipath, obstructions, satellite geometry, and atmospheric conditions. Always follow recommended survey practices.

² Depends on WAAS/EGNOS system performance.

³ Two batteries supplied standard.

⁴ Authorized Spectra Precision SD cards only.



- Affordable GPS solution
- Survey-grade L1 GPS receiver
- L1 GPS antenna
- Recon data collector
- Spectra Precision Field Surveyor* software for EPOCH 10
- Spectra Precision Survey Office software
- Field-proven technology

The Spectra Precision® EPOCH® 10 GPS System is a completely integrated L1 GPS postprocessed solution. It combines an L1 GPS receiver, an antenna, and a rugged handheld Spectra Precision Recon data collector. The EPOCH 10 operates without line-of-sight between points, and it can operate day or night in just about any weather.

Additionally, the EPOCH 10 system includes fully integrated software for field and office. Spectra Precision Field Surveyor* software runs on the Recon data collector, working in the field to collect and manage the data. When you return to the office, download the data to Survey Office software for postprocessing.

Spectra Precision Field Surveyor* GPS technology for L1 GPS delivers superior satellite tracking, faster measuring, optimal precision, and lower power usage. Plus, the GPS antenna resists unwanted signal interference that may give inaccurate measurements.

The GPS receiver simply fits into the CompactFlash (CF) slot of the Recon data collector and is protected by a customized CF cap that fits securely over the receiver. The compact, lightweight Recon data collector comes with a 15-hour battery, and you can operate the Recon data collector with the EPOCH 10 system for up to eight hours without recharging the battery.

* Interlock software in North America

DATA COLLECTION

When connected to the Spectra Precision Recon data collector:

- Application file and data management
- Color touch-screen indicators for satellite tracking, data logging, and power

GENERAL

Power

Input 5 V DC

Power consumption

0.6 W receiver and antenna

Battery

Up to 8 hours data collection

Battery weight

0.20 kg (0.44 lb)

Battery charge

Internal with external AC power adapter

Temperature

Operating temperature -30°C to $+60^{\circ}\text{C}$
(-22°F to 140°F)

Long-term storage

-40°C to $+70^{\circ}\text{C}$ (-40°F to $+158^{\circ}\text{F}$)

Humidity

100%, condensing

PERFORMANCE SPECIFICATIONS

Measurements

- Unfiltered, unsmoothed pseudorange measurement data for low noise, low multipath error, and high dynamic response
- Very low noise L1 measurements with 1 mm precision at 1 Hz
- 12 Channels L1 C/A Code, L1 Full Cycle Carrier, WAAS/EGNOS¹
- WAAS/EGNOS differential positioning accuracy typically $<3\text{ m } 3\text{DRMS}^2$

Static GPS surveying

Horizontal

$\pm 5\text{ mm} + 0.5\text{ ppm} \times (\text{baseline length})\text{ RMS}$

Vertical

$\pm 5\text{ mm} + 1\text{ ppm} \times (\text{baseline length})\text{ RMS}$

Kinematic surveying

Horizontal

$\pm (10\text{ mm} + 1\text{ ppm}) \times (\text{baseline length})\text{ RMS}$

Vertical

$\pm (20\text{ mm} + 1\text{ ppm}) \times (\text{baseline length})\text{ RMS}$

See complete Recon specifications in the Spectra Precision Data Collectors section of this catalog

¹ WAAS/EGNOS capable GPS Receiver dependant on field software application.

² Depends on WAAS/EGNOS system performance.

TECHNICAL SPECIFICATIONS

Physical

Dimensions (W×H×L)

$9.5\text{ cm} \times 4.4\text{ cm} \times 24.2\text{ cm}$
($3.7\text{ in} \times 1.7\text{ in} \times 9.5\text{ in}$)

Weight (with internal batteries)

0.62 kg (1.3 lb)



FOCUS 8 Total Station



- 2" and 5" angle accuracy
- Affordable Total Station
- Windows CE
- Accurate distances and stable angles
- 300 m (984 ft) reflectorless measurement
- Tough and reliable
- Spectra Precision Survey Pro on-board
- All-weather construction
- Long battery life

The Spectra Precision® FOCUS® 8 Total Station offers the power of a Windows CE operating system and world class Spectra Precision Survey Pro field software combined with clear-to-view quality optics, smart design, and superior components that your surveying jobs demand.

The Spectra Precision FOCUS 8 has intuitive Survey Pro on-board software that is easy to use and it has a large display that makes data management simple.

Touch-screen technology also improves data workflow speed to access menus and software modes for fast every day data management. The Windows CE operating system supports a full alphanumeric 'pop-up' keyboard helping users to enter data quickly and accurately.

Built tough for use on your every day work site in all degrees of dust, dirt, and weather conditions. The large graphic display uses features such as different font sizes, icons, and pop-up menus to make the on-board software system intuitive and easy to learn for maximum efficiency.

Use the FOCUS 8 to reliably measure and save all your topographic and staking needs. This solution includes key features such as:

- Quick Coding: for lightning fast feature coding
- CoGo: for your in-field calculations
- Fast Measure: configure keys for one touch measurement.

All FOCUS 8 models support Bluetooth communications to external data collectors. In addition, all models come standard with a traditional optical plummet which can be upgraded to a laser plummet.

¹ White objects with high reflectivity (KGC 90%). Measuring distance may vary depending on targets and measuring conditions.

² $\pm(3+3 \text{ ppm} \times D) \text{ mm}$ -20°C to -10°C , $+40^{\circ}\text{C}$ to $+50^{\circ}\text{C}$ (-4°F to $+14^{\circ}\text{F}$; $+104^{\circ}\text{F}$ to $+122^{\circ}\text{F}$)

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 times may vary depending on the condition and deterioration of the battery.

TELESCOPE

Magnification

30 \times (18 \times /36 \times with optional eyepieces)

Effective diameter of objective

2" 40 mm (1.6 in)

2" EDM diameter: 45 mm (1.8 in)

5" 45 mm (1.8 in)

5" EDM diameter: 50 mm (2.0 in)

Minimum focusing distance

1.5 m (4.9 ft)

With single prism 6.25 cm (2.5 in)

2" 1.5m to 3,000m (4.9 ft to 9,843 ft)

5" 1.5 m to 5,000 m (4.9 ft to 16,404 ft)

Accuracy² (Precise mode)

2" Prism $\pm(2+2 \text{ ppm} \times D) \text{ mm}$

2" Reflectorless $\pm(3+2 \text{ ppm} \times D) \text{ mm}$

5" Prism $\pm(3+2 \text{ ppm} \times D) \text{ mm}$

5" Reflectorless $\pm(3+2 \text{ ppm} \times D) \text{ mm}$

Measuring interval³

Precise mode

2" Precise mode 1.6 sec.

5" Precise mode 1.5 sec.

Normal mode 0.8 sec.

Reflectorless mode

2" Precise mode 2.1 sec.

5" Precise mode 1.8 sec.

2" Normal mode 1.2 sec.

5" Normal mode 1.0 sec.

Least count

Precise mode 1 mm (0.002 ft)

Normal mode 10 mm (0.02 ft)

DISTANCE MEASUREMENT

Reflectorless mode (white target)¹

1.5 m to 300 m (4.9 ft to 984 ft)

Range with specified prisms

Good conditions

(No haze, visibility over 40 km (25 miles))

With reflector sheet 5 cm x 5 cm (2 in x 2 in)

2" 1.5 m to 270 m (4.9 ft to 886 ft)

5" 1.5 m to 300 m (4.9 ft to 984 ft)

GENERAL SPECIFICATIONS

Operating temperature range

-20°C to $+50^{\circ}\text{C}$ (-4°F to $+122^{\circ}\text{F}$)

Atmospheric correction

-40°C to $+60^{\circ}\text{C}$ (-40°F to $+140^{\circ}\text{F}$)

Barometric pressure

400 mmHg to 999 mmHg

533 hPa to 1,332 hPa

15.8 inhg to 39.3 inhg

Minimum increment (Degree, Gon, MIL6400)

Degree: 1/5/10"

Gon: 0.2/1/2 mgon

MIL6400: 0.005/0.02/0.05 mil

DIN 18723 accuracy (horizontal and vertical)

2" 0.5 mgon

5" 1.5 mgon

Dust & water protection

IP66

Tilt Sensor

Type

Dual axis

Level vials

Sensitivity of Circular level vial

10'/2 mm

Optical plummet

Magnification

3 \times

Display face 1

VGA, 16 bit color, TFT LCD, backlight (320x240 pixel)

Display face 2

Backlit, graphic LCD (128x64 pixel)

Point memory

128 MB RAM, 128 MB Flash memory

Dimensions (W x D x H)

149 mm x 145 mm x 306 mm

(5.8 in x 5.7 in x 12.0 in)

Weight (approx.)

Main unit (without battery)

2" 3.9 kg (8.6 lb)

5" Main unit (without battery) 3.8 kg (8.4 lb)

Battery

0.1 kg (0.2 lb)

Carrying case

2.3 kg (5.1 lb)

Internal Li-ion battery (x2)

Operating time⁴

2"

approx. 12 hours (continuous distance/angle measurement)

approx. 26 hours (distance/angle measurement every 30 seconds)

approx. 28 hours (continuous angle measurement)

5"

approx. 7.5 hours (continuous distance/angle measurement)

approx. 16 hours (distance/angle measurement every 30 seconds)

approx. 20 hours (continuous angle measurement)

Charging time (Full charge)

4 hours

FOCUS 6 Total Station



- 2" and 5" angle accuracy
- Affordable Total Station
- Accurate distances and stable angles
- 300 m (984 ft) reflectorless measurement
- Tough and reliable
- On-board data collection
- All-weather construction
- Long battery life

The Spectra Precision® FOCUS® 6 Total Station offers clear-to-view quality optics, smart design, and superior components your surveying jobs demand. The FOCUS 6 is a fast measuring device in both Prism (0.8 sec) and Reflectorless (1.0 sec) modes for improving your day-to-day field operations.

For most construction and surveying applications the FOCUS 6 Total Station 2" and/or 5" accuracy is ideal. Coupled with its quality, you can be confident that you are achieving this level of accuracy with every measurement.

On a single battery, the FOCUS 6 provides full measurement every 30 seconds for 15+ hours. It's tough, water resistant, and will continue working no matter what the weather brings. The smart small design of the FOCUS 6 is convenient and portable for all occasions.

The Spectra Precision FOCUS 6 total station has intuitive on-board software that is easy-to-use. Want to make your FOCUS 6 even more powerful? Instead of on-board data collection you can choose to use a Spectra Precision Ranger, Nomad, or Recon data collector powered by Survey Pro to maximize performance in the field.

TELESCOPE

Magnification

30x (18x/36x with optional eyepieces)

Effective diameter of objective

2" 40 mm (1.6 in)

2" EDM diameter. 45 mm (1.8 in)

5" 45 mm (1.8 in)

5" EDM diameter. 50 mm (2.0 in)

Minimum focusing distance

1.5 m (4.9 ft)

DISTANCE MEASUREMENT

Reflectorless mode (white target)¹

1.5 m to 300 m (4.9 ft to 984 ft)

Range with specified prisms

Good conditions (no haze, visibility over 40 km (25 miles))

With reflector sheet 5 cm x 5 cm (2 in x 2 in)

2" 1.5 m to 270 m (4.9 ft to 886 ft)

5" 1.5 m to 300 m (4.9 ft to 984 ft)

With single prism 6.25 cm (2.5 in)

2" 1.5 m to 3,000 m (4.9 ft to 9,843 ft)

5" 1.5 m to 5,000 m (4.9 ft to 16,404 ft)

Accuracy² (Precise mode)

2" Prism $\pm(2+2 \text{ ppm} \times D)$ mm

5" Prism $\pm(3+2 \text{ ppm} \times D)$ mm

2" Reflectorless $\pm(3+2 \text{ ppm} \times D)$ mm

5" Reflectorless $\pm(3+2 \text{ ppm} \times D)$ mm

Measuring interval³

Prism mode

2" Precise mode 1.6 sec.

5" Precise mode 1.5 sec.

Normal mode 0.8 sec.

Reflectorless mode

2" Precise mode 2.1 sec.

5" Precise mode 1.8 sec.

2" Normal mode 1.2 sec.

5" Normal mode 1.0 sec.

Least count

Precise mode 1 mm (0.002 ft)

Normal mode 10 mm (0.02 ft)

GENERAL SPECIFICATIONS

Operating temperature range

-20 °C to +50 °C (-4 °F to +122 °F)

Atmospheric correction

-40 °C to +60 °C (-40 °F to +140 °F)

Barometric pressure

400 mmHg to 999 mmHg

533 hPa to 1,332 hPa

15.8 inHg to 39.3 inHg

Minimum increment (Degree, Gon, MIL6400)

Degree: 1/5/10"

Gon: 0.2/1/2 mgon

MIL6400: 0.005/0.02/0.05 mil

DIN 18723 accuracy (horizontal and vertical)

2" 0.5 mgon

5" 1.5 mgon

Dust & Water protection

IP66

Tilt sensor

Type

Dual axis

Level vial

Sensitivity of Circular level vial

10'/2 mm

Optical plummet

Magnification

3x

Display

Graphic LCD (128 x 64 dot); Single side

Point memory

10,000 records

Dimensions (W x D x H)

149 mm x 145 mm x 306 mm

(5.8 in x 5.7 in x 12.0 in)

Weight (approx.)

Main unit (without battery)

2" 3.8 kg (8.4 lb)

5" 3.6 kg (8.0 lb)

Battery

0.1 kg (0.2 lb)

Carrying case

2.3 kg (5.1 lb)

Internal Li-ion battery (x2)

Operation time⁴

2" approx. 19 hours (continuous distance/angle measurement)

approx. 57 hours (distance/angle measurement every 30 seconds)

approx. 62 hours (continuous angle measurement)

5" approx. 10 hours (continuous distance/angle measurement)

approx. 26 hours (distance/angle measurement every 30 seconds)

approx. 31 hours (continuous angle measurement)

Charging time (Full charge)

4 hours

¹ White objects with high reflectivity (RGC 90%). Measuring distance may vary depending on targets and measuring conditions.

² $\pm(3+3 \text{ ppm} \times D)$ mm -20 °C to -10 °C, +40 °C to +50 °C (-4 °F to +14 °F, +104 °F to +122 °F)

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 times may vary depending on the condition and deterioration of the battery.

Ranger

Data Collector



- Ergonomic, alpha and numeric keys
- Meets MIL-STD-810F standards
- IP67 rating
- Featuring Spectra Precision Survey Pro software
- Two CompactFlash (CF) slots
- One Secure Digital (SDIO) slot
- 30-hour rechargeable battery
- Windows Mobile 5.0
- Integrated Bluetooth and 802.11g wireless

The field-proven Spectra Precision® Ranger™ Data Collector delivers military-grade durability with the features surveyors depend on. It meets rigorous MIL-STD-810F military standard for drops, vibration, humidity and extreme temperatures, and with an IP67 rating, it's impervious to water and dust, keeping your data safe. The Ranger features Survey Pro and Windows Mobile 5.0, with the capability to run the mobile version of all your favorite programs including Excel and Outlook. Integrated wireless capabilities let you connect to field equipment without bulky cables. Plus, with CF and SD slots, you can add multiple accessories and increase data storage. The Ranger comes in three models; the powerful 500X, the economical 300X, and the simple NX. The powerful 500X and the economical 300X provide you options without limiting any features. The 500X also includes the 2.4 GHz robotic radio. The Ranger NX is a 300X without the expansion slots and is our most affordable model.

MODELS OVERVIEW	500X	300X	NX
PROCESSOR/SPEED			
Intel XScale	520 MHz	312 MHz	312 MHz
MEMORY			
SDRAM	128 MB	64 MB	64 MB
Data storage (On-board Flash)	512 MB	256 MB	128 MB
WIRELESS			
Integrated Bluetooth	Standard	Standard	N/A
Integrated 802.11g	Optional	N/A	N/A
FEATURES			
2.4 GHz robotic radio Module	Optional	N/A	N/A

STANDARD FEATURES

- Microsoft Windows Mobile 5.0
- 53 tactile key alphanumeric keypad, 8 position spider key
- Touch-screen
- Battery life of 30 hours under normal operating conditions
- Complete recharge in 4.5 hrs (80% in 2 hrs)
- Battery charge status LED indicator
- Notification LED
- Rugged polycarbonate shell
- Integrated speaker and microphone

PHYSICAL

Size

266 mm × 131 mm × 48 mm
(10.5 in × 5.2 in × 1.9 in)

Weight

0.95 kg (2.1 lb) including battery
1.09 kg (2.4 lb) including battery and optional internal radio

ELECTRICAL

Processor

Intel PXA 270 XScale CPU

Expansion

1x Type I and 1x Type II CompactFlash slots²
1x Secure Digital (SDIO) slot²

Display

Color, illuminated TFT, daylight-readable touch-screen displayed at 320 × 240 pixels

Power

Li-Ion rechargeable pack, 6600 mAh

² Not applicable to Ranger NX model.

ENVIRONMENT

Operating Temperature

−30 °C to 60 °C (−22 °F to 140 °F)

Storage Temperature

−40 °C to 70 °C (−40 °F to 158 °F)

Humidity

100% condensing, MIL-STD-810F, Method 507.4

Water

IP67, sealed against accidental immersion (1 m for 30 min.)

MIL-STD-810F, Method 512.4, Procedure I

Sand & Dust

IP67, MIL-STD-810F, Method 510.3, Procedures I & II

I/O

Ports

9-pin serial port RS-232 (115 Kbps)
USB client and host
DC power port

STANDARD SOFTWARE

Internet Explorer
File Explorer
Word Mobile
Power Point Mobile
Excel Mobile
Outlook Mobile
Windows Media® Player Mobile
Microsoft ActiveSync® technology
Microsoft Transcriber (handwriting recognition)
Pictures, Picture&Videos, Calendar, Contacts, Tasks and Notes
Online help

STANDARD ACCESSORIES

Rechargeable Lithium-Ion battery module
Internation AC re-charger (100V–240V)
Standard CF-Cap
USB data cable
Hand strap
Stylus pen
Stylus pen lanyard
2 screen protectors
Nylon carry case

Drop

MIL-STD-810F, Method 516.5, Procedure IV 48" onto concrete, 26 drops at room temperature (all faces, edges, corners, one drop each)
6 additional drops at −30 °C (−22 °F)
6 additional drops at 60 °C (140 °F)

Vibration

MIL-STD-810F, Method 514.5, Procedure I, Figs. 5 & 17

Altitude

4,572 m (15,000 ft) at 23 °C (73 °F)

MIL-STD-810F, Method 500.4, Procedures I, II & III



- Full VGA display
- Meets MIL-STD-810F standards, IP67 rating
- Backlit Numeric keypad
- Featuring Spectra Precision Survey Pro software
- 806 MHz processor
- Optional integrated GPS
- Optional integrated Bluetooth, WiFi 802.11g
- 15-hour rechargeable battery
- Windows Mobile 6
- Optional integrated WAN

The Spectra Precision® Nomad® Data Collector, packed with functionality, is an extremely powerful and full-featured rugged data collector. Start with an 806 MHz processor, a long-life 5200 mAh lithium-ion battery and integrated wireless capabilities like GPS, WiFi 802.11g, and Bluetooth. Then, the Spectra Precision Nomad adds 128 MB RAM and 1 full GB non-volatile Flash storage to manage all the data you can collect.

The Nomad features a high-resolution, sunlight-visible full VGA display that shows graphics and maps in crisp detail plus a backlit numeric keypad.

The Nomad is available in a range of solutions from the powerful 800X, the camera-based 800LC, the traditional 800LD and the economical 800B, each packed with features and benefits to suit your specific needs.

MODEL OVERVIEW

	800X	800LC	800LD	800B
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PROCESSOR/SPEED

Marvell PXA320 XScale	806 MHz	806 MHz	806 MHz	806 MHz
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MEMORY

DDR SDRAM	128 MB	128 MB	128 MB	128 MB
Data storage (On-board Flash)	2 GB	1 GB	1 GB	512 MB

FEATURES

Integrated Card Slots	SD/CF	D	SD/USB	SD/CF
Integrated Bluetooth	x	x	x	x
Integrated GPS, Navigational Grade	x	x	x	
Integrated WiFi 802.11g	x	x	x	
Integrated WWAN	x			
Integrated Camera		x		

STANDARD FEATURES

- Windows Mobile 6 (Classic edition)
- Numeric keypad with backlight
- Marvell 806 MHz XScale processor
- 128 MB DDR SDRAM
- 1 GB nonvolatile Flash storage (800LD)
- 2 GB nonvolatile Flash storage (800X)
- Full VGA display, sunlight-readable color TFT
- Touch-screen
- Rugged submersible design
- Integrated speaker and microphone
- Integrated Bluetooth 2.0
- Secure Digital (SDIO) slot
- Notification LEDs
- 15-hour battery life with active use (default settings)

PHYSICAL

Size

17.6 cm x 10.0 cm x 5.0 cm
(6.92 in x 3.92 in x 1.96 in)

Weight

0.596 kg (21 oz) with rechargeable Lithium-Ion battery module

ELECTRICAL

Processor

806 MHz Marvell PXA320 XScale CPU

Display

480x640 pixel (full VGA) 16 bit color TFT with LED backlight, Sunlight readable color TFT display

Batteries

Internal 5200 mAh Lithium-Ion, rechargeable battery module, 15 hours battery life with active use (default settings)

ENVIRONMENT

Operating Temperature

-30 °C to 60 °C (-22 °F to 140 °F)

Storage Temperature

-40 °C to 70 °C (-40 °F to 158 °F)

Humidity

MIL-STD-810F, Method 507.4

Water

IPX7, sealed against accidental immersion (1 m for 30 minutes)
MIL-STD-810F, Method 512.4, Procedure I

I/O

Standard 9-pin male D-shell RS-232 serial port (115 kbps)
Mini USB-Guest port
DC power port

STANDARD SOFTWARE

Microsoft® Windows Mobile® 6 software programs including:

- Internet Explorer Mobile
- File Explorer
- Word Mobile
- Excel Mobile
- PowerPoint Mobile
- Outlook Mobile
- Microsoft Windows Media Player
- Microsoft ActiveSync
- Microsoft Pictures & Videos
- Calendar, Contacts, Notes, Tasks, Calculator
- Online Help

STANDARD ACCESSORIES

Rechargeable Lithium-Ion battery module
International AC re-charger (100V-240V)
Standard CF-Cap
USB data cable
Hand strap
Stylus pen
Stylus pen lanyard
2 screen protectors
Nylon carry case

Drop

MIL-STD-810F, Method 516.5, Procedure IV;
26 drops from 1.22 m (4 ft) onto plywood over concrete

6 additional drops at -30 °C (-22 °F)
6 additional drops at +60 °C (+140 °F)

Sand and dust

IP6X, MIL-STD-810F, Method 510.3,
Procedures I & II

Vibration

MIL-STD-810F, Method 514.5, Procedure I

Altitude

MIL-STD-810F, Method 500.4, Procedures I, II and III;
4572 m (15,000 ft) at +23 °C (+73 °F)



- Featuring Spectra Precision Survey Pro software
- Weighs just 490 grams (17 oz)
- Meets MIL-STD-810F standards
- IP67 rating
- Two CompactFlash (CF) slots
- 400 MHz processor
- Integrated Bluetooth
- 15 hour rechargeable battery
- Windows Mobile 6

The Spectra Precision® Recon® Data Collector delivers maximum performance and reliability in a lightweight, extremely rugged design that's easy to carry. The waterproof Recon weighs just 490 gm (17 oz), meets military specifications for drops, vibration, and both high and low temperature operation, and runs Windows Mobile 6. The Recon offers industry-standard COM ports and a sunlight-readable color TFT display, so it works wherever and whenever you need it. If portability, data security, and maximum operating time are crucial to your work, you can count on the Recon.

Its innovative design provides customization options to suit your different applications. Two CompactFlash (CF) slots and embedded Bluetooth wireless capabilities add to the versatility of the Recon data collector.

MODELS OVERVIEW	400X	NX
PROCESSOR/SPEED		
Intel XScale	400 MHz	400 MHz
MEMORY		
SDRAM	64 MB	64 MB
Data storage (On-board Flash)	256 MB	128 MB
WIRELESS		
Integrated Bluetooth	Standard	Standard

STANDARD FEATURES

- Windows Mobile 6
- 400 MHz Intel PXA255 XScale processor
- 64 MB high-speed SDRAM
- 256 MB nonvolatile Flash storage (NX: 128 MB)
- Sunlight-readable color TFT display
- Touch-screen
- Rugged waterproof design
- Integrated speaker and microphone
- 15 hours of continuous room-temperature operation with default settings
- Integrated Bluetooth

PHYSICAL

Size

16.5 cm x 9.5 cm x 4.5 cm (6.50 in x 3.75 in x 1.75 in)

Weight

490 g (17 oz) w/PowerBoot Module

ELECTRICAL

Processor

Intel PXA255 XScale CPU

Expansion

1x Type I and 1x Type II CompactFlash slots

Display

240 x 320 pixel (1/4 VGA) color TFT with LED front light

Power

NiMH rechargeable pack 4000 mAh

ENVIRONMENT

Operating temperature

-30 °C to 60 °C (-22 °F to 140 °F)

Storage Temperature

-40 °C to 70 °C (-40 °F to 158 °F)

Humidity

MIL-STD-810F, Method 507.4

Water

IP67, sealed against accidental immersion (1 m for 30 min.)

MIL-STD-810F, Method 512.4, Procedure I

Sand and dust

IP67, MIL-STD-810F, Method 510.4, Procedures I

I/O

Ports

Standard 9-pin male D-shell RS-232 serial port (115 kbps)

USB client

DC power port

STANDARD SOFTWARE

Word Mobile

Excel Mobile

Outlook Mobile

Contacts

PowerPoint Mobile

Calculator

Internet Explorer Mobile

Calendar

Windows Media Player

Online help

Microsoft ActiveSync

Notes

Terminal services client

Tasks

Microsoft Pictures and Videos

STANDARD ACCESSORIES

AC charger

USB cable

Standard CF-Cap

Stylus Lanyard

Screen protectors

Hand strap

Stylus

PowerBoot Module

Nylon carry case

Drop

MIL-STD-810F, Method 516.5, Procedure IV
26 drops from 1.22 m (4 ft)

onto plywood over concrete

6 additional drops at -30 °C (-22 °F)

6 additional drops at 60 °C (140 °F)

Vibration

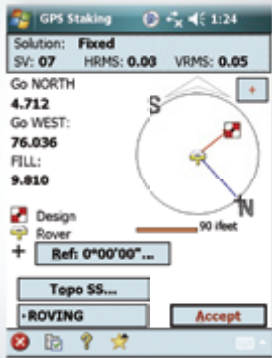
MIL-STD-810F, Method 514.5, Procedure I
(Fig. 17) & II

Altitude

15,000 ft at 23 °C (73 °F)

MIL-STD-810F, Method 500.4,

Procedures I, II & III



Spectra Precision® 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 Spectra Precision Survey Office software. Survey Pro software ships on Spectra Precision'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. 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 Precision 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 Precision 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.

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.

For a complete function list, please go to www.spectraprecision.com/surveypro-page.aspx

Spectra Precision® Survey Office software is ideal for processing and analyzing GPS and GNSS, and terrestrial (total station and level) survey data recorded in the field, and exporting it to a design package. The software provides numerous innovative and unique features, and it is easy to learn and use.

With Spectra Precision Survey Office software on your PC you have the ability to work

with RTK and Static/PPK data to generate reports as well as identify and correct field errors. Import data from existing surveys or directly from the Internet and export data as points, or in CAD or XML format. Rest assured that your data is secure and reliable with built-in quality assurance and quality control features. The intuitive, integrated Spectra Precision Survey Office software saves time with its short learning curve and powerful features.

Survey data acquired in the field using a total station and contained in a data file can be imported into the software and integrated as necessary with other data collected as part of a survey project (for example, GNSS or level data).

The Spectra Precision Survey Office software is powerful and configurable, yet easy-to-use. The user interface features options that are familiar to Microsoft Office users. Drag-and-drop compatible files from your computer directly into an open project and the Spectra Precision Survey Office software analyzes the file to determine its type and how it needs to be processed. Visualization tools such as Plan views, 3D views, time-based data views and session editors help you "see" the data in the context of the entire project.

The Spectra Precision Survey Office software provides surveyors and engineers with advanced technology, integrating common tasks into a single system. Process and review RTK, Static, FastStatic, and stop-and-go Kinematic data. Spectra Precision Survey Office also performs data reduction, computation, QA/QC and network adjustment. Control data can be exported to the field software for use in the field.



SAMPLE FEATURES/FUNCTIONS

OVERVIEW

Core Features

Import/Export
Project explorer view of data hierarchy
Graphic views (Plan View, 3D View)
Lists of data allowing sorting and selection
Points spreadsheet
Occupation spreadsheet
Reports and quality assurance plots
Internet download – for base stations and precise ephemeris

Basic module

GNSS L1 postprocessing
Loop closure report
Network adjustment (L1 vectors)
Complete module
GNSS postprocessing
Full network adjustment

SOFTWARE FEATURES

File

Project New/Open/Close/Save/Archive
Page Setup
Print Preview/Print
Import/Export
Survey
DC (Survey Data Collector)
Trajectory (CSV)
CAD
DXF
DWG
Construction
LandXML
Custom
Points (user-defined ASCII export format)
Import/Export Format Editor
Internet Download

Edit

Undo/Redo/Delete/Add Point
Explode Blocks
Properties

View

New Plan View/New 3D View
New Spreadsheet Points/Vector/Occupation
New Time-based View
Toggle Gridlines/Line marking
3D View settings
Project Explorer/Selection Explorer
Device Pane
Command Pane
Flags pane
View Filter Manager
Zoom
Pan/Pan Precise
Float/Unfloat View

Project

Project Settings
Change Coordinate System
Local Site Settings
Datum Gridding
Geoid Sub-Gridding
Compute Project
Snap Mode
Layer Options

Select

Select All
Invert Selection
Select/Duplicate Points
Select Observations
Select Unprocessed Sessions
Select by Elevation Range/Layer
Advanced Select
Selection Set (save, manage, retrieve selection sets)

Point

Create/Merge/Merge Duplicate/Rename

Survey

Feature coding
Process Baselines
Clear Processing Results
Sessions Editor
Adjust Network
Clear Adjustment Results
Site Calibration/Clear Site Calibration
Inverse
Mean Angle/Mean Angle residuals
Level editor

Reports

Baseline Processing Report
Import report
Mean Angle Report
Network Adjustment Report
Point Derivation Report
Point List
Project Computation Report
Site Calibration Report
Vector List
Job Report Generator
Report Options

Tools

Coordinate System Manager
Feature Definition Manager
Planning
External Tools Manager
Measure Angle
Explore Object
Configuration / Data transfer Web page
Customize / Options

Window

New Horizontal Tab Group
New Vertical Tab Group
Move to Previous Tab Group
Move to Next Tab Group
Close All Windows



- Widest automatic self-leveling range available
- Patented Target Lens transfers the beam up at an angle for easy viewing by the pipe layer
- Industry's largest display
- Armor-plated housing
- Rubberized front bumper
- Line Alert*
- Line Set-Check*

The Spectra Precision® Laser DG711 and DG511 pipe lasers feature the largest automatic leveling range in the industry, providing quick, easy setups, regardless of the grade. Unlike traditional pipe lasers, there is no need for rough leveling, thus minimizing crew training. Simply set up the laser in the pipe, manhole or open cut, set the proper grade and start working.

The DG711 and DG511 Pipe Lasers are built tough for long lasting performance and reliability. The DG711 and DG511 pipe lasers are completely waterproof and designed to ensure easy cleanup. Setup is fast with a full range of mounting accessories available, and easy to use with straightforward, "no-instructions-required" controls. In addition, through the Service Alert feature, they keep track of their own maintenance needs, indicating at pre-set intervals when it's time for a check-up.

The DG711 has two additional features: Line Alert and Line Set-Check. Line Alert is a unique feature that is ideal for working in high-vibration or wet conditions where the pipe lasers may be disturbed. The beam flashes to notify you that the setup line has been disturbed, eliminating the necessity of rework. The Line Set-Check capability of the pipe laser allows you to raise the beam outside of the trench for fast line setup or checking. Raising the laser beam out of the trench to an above-ground stake saves you time, instead of having to move the excavator off-line during setup of the pipe laser; you can just get on with your job. In addition, the Line Set-Check feature is ideal for rechecking the line in pipe jacking pits after each push.

Spectra Precision pipe lasers feature a very rugged design and a variety of unique technological capabilities. These pipe lasers stand

up to corrosion from acids, chemicals, salts, and other destructive underground elements as well as to the physical abuse typical in the construction industry.

	DG711	DG511
PERFORMANCE SPECIFICATIONS		
Grade Range	-15% to +40%	-15% to +40%
Self-Leveling Range	Complete grade range (no rough leveling required)	Complete grade range (no rough leveling required)
Line Range	20°	20°
Line Center	Yes	Yes
Grade Zero and Quick Grade	Yes	Yes
Line Set/Check	Yes	
Line Alert	Yes	
Temperature Compensation	Yes	
Grade Compensation	Yes	Yes
Maintenance Interval Notification	Selectable Intervals: 3, 6, 12, 18 or 24 Months 2 Years	Selectable Intervals: 3, 6, 12, 18 or 24 Months 1 Year
Warranty Period		
LASER CLASSIFICATION		
Laser output	4.5 to 5 mW (maximum allowable)	4.5 to 5 mW (maximum allowable)
Laser classification	3A/3R	3A/3R
GENERAL CLASSIFICATIONS		
Weight	3.6 kg (8.0 lb)	3.6 kg (8.0 lb)
Length	37.5 cm (14.75 in)	37.5 cm (14.75 in)
Diameter	14 cm (5.5 in)	14 cm (5.5 in)
Housing material	Armored Die Casting H	Hard Anodized Aluminum
Battery type and life	NiMH / 60 Hours with Daily Setup at 20 °C (68 °F)	NiMH / 60 Hours with Daily Setup at 20 °C (68 °F)
Battery pack	Sealed (NiMH), O-Ring Sealed Removable (Alkaline)	Sealed (NiMH), O-Ring Sealed Removable (Alkaline)
Operating voltage	6 V DC to 16 V DC	6 V DC to 16 V DC
Operating temperature	-20 °C to 60 °C (-4 °F to 140 °F)	-20 °C to 60 °C (-4 °F to 140 °F)
Waterproof	Continuous Submersion at 3 m (10 ft)	Continuous Submersion at 3 m (10 ft)
WIRELESS REMOTE CLASSIFICATIONS		
Functionality	7 Button Power, Line and Grade Adjustment, Line Set	3 Button Power, Line Adjustment
Through the Pipe Range	225 m (750 ft)	225 m (750 ft)
Front / Over the Top Range	150 m (500 ft)	150 m (500 ft)
Rear Range	10 m (30 ft)	10 m (30 ft)
Battery life (normal operation)	2 Years / 24 Months	3 Years / 36 Months

* DG711 Model only

Available at authorized Spectra Precision dealers



- Automatic electronic self-leveling
- Large compensated grade range from -10% to +15%
- Single and Dual grade application
- Electronic leveling vibration filter
- Automatic temperature and grade compensation
- Automatic Grade Matching
- PlaneLok
- Mask mode
- High capacity NiMH battery pack

The Spectra Precision® Laser GL512 single grade and GL522 dual grade transmitters are rugged, cost-effective, automatic self-leveling lasers that do three jobs—level, grade, and vertical alignment.

Both the GL512 and GL522 include a 2-way, full-function radio remote control with a built-in back-lit grade display. You can do everything with the remote control that you can do at the laser keypad, up to 100 m (330 ft) away from the laser—even from the cab of a machine! The ability to make grade changes from anywhere on the job greatly reduces setup time and speeds operation. Verbal and visual communication errors are eliminated.

New wireless communication between the HL750 Laserometer and the transmitters provide automatic Grade Matching. Grade Matching allows measurement of unknown grade values between two points. PlaneLok is also available in both the horizontal and vertical planes. PlaneLok automatically locks the beam on the receiver and keeps it on grade. This eliminates all environmental factors that may induce an error.

The GL512 and GL522 Grade Lasers self-plumb in the vertical position to allow an even wider range of applications such as anchor bolt installation, tilt up, and curtain wall plumbing.

Both units incorporate automatic temperature and grade compensation for high accuracy in any weather or geographical location. Also, the laser beam can be turned off electronically on up to 3 sides of your choice. This capability eliminates interference with other crews on the jobsite by keeping the beam from straying into other areas.

The GL522 offers an additional advanced feature that stops the rotation and points the laser along one axis for “Over the Top” pipe laying applications.

The GL512 and GL522 packages include the laser, RC402 remote, choice of either a HL750 or a CR600 receiver with clamps, NiMH rechargeable batteries & charger, and hard shelled carrying case.

GENERAL SPECIFICATIONS

Laser type/class

<5 mW 635 nm, Class 3A/3R (GL522)
3 mW 650 nm, Class 2 (GL512)

Drop height on concrete

1 m (3 ft)

Operating diameter

(w/ HL750) 800 m, 2,600 ft (GL522)
600 m, 2,000 ft (GL512)

Compensation method

H/V Electronic Self Leveling

Temperature compensation

Yes, every 5 °C

Level / vertical accuracy

10 arc seconds
1.5 mm @ 30 m (1/16" @ 100 ft)

Grade range

-10 to +15% Dual Axes (GL522)
-10 to +15% Single Axis (GL512)

Grade accuracy

0.015% 3 mm@30 m (1/8" @ 100 ft)

Grade resolution

0.001% up to 9.999%,
0.01 % at higher grades

Grade compensation

Yes

Transmitter battery life

(4 x D NiMHs)
55 hours

Mask mode

User selectable to any window, 3 max.

Remote control type

Full 2-way communication,
operation and security lock with transmitter

Remote control range

100 m (330 ft) radius

Rotation speed

0 (GL522), 300, 600 RPM selectable

RC402 battery Life

(2 x AA Alkaline)
130 hrs continuous
1 year under normal use

Standby mode

Yes

Display backlight

Yes, auto shutoff after 8 seconds

Mounting threads

5/8" x 11 Horizontal and Vertical

Operating temperature

-20° to +50°C (-4° to 122°F)

Dust and waterproof

Yes - IP66

Dimensions

21L x 18W x 20H cm (8.3L x 7.1W x 7.9H in)

Weight

3.1 kg (6.8 lb)

Warranty

2 Years



- Automatic self-leveling
- Durable construction
- One touch operator controls for quick start up
- Long battery life
- Exclusive instant "Over the Counter" replacement warranty, for 3 years*

More contractors around the world use Spectra Precision lasers to increase construction jobsite productivity and profitability than any other brand. Each laser comes with the solid dependability that has made the Spectra Precision Laser name the standard in the industry.

The automatic, self-leveling Spectra Precision Lasers are the most rugged lasers available, tough enough to handle a wide variety of general and concrete construction applications. Even in harsh jobsite conditions, these lasers will deliver consistent, reliable and accurate performance, enabling you to work faster and smarter.

LL300**

- Delivers consistent reliable performance even in the harshest jobsite conditions
- Customizable to your needs with choice of two receivers

The rugged Spectra Precision® Laser LL300 laser can withstand drops of up to 1 m (3 ft) onto concrete and tripod tip-overs up to 1.5 meters (5 ft). This strength, combined with full weatherproofing and dust proofing, reduces downtime and lowers repair costs over the life of the product. The LL300 laser's self-leveling capability and optional RC601 remote control result in outstanding accuracy and ease of use. Since the LL300 laser levels itself when turned on, setup is easy with fewer controls to deal with. The RC601 remote control gives you the option of matching slopes or having slopes-on-grade. It also offers single-axis slope including HI warning control with the other axis continuing to level itself.

LL100

- Complete leveling crew in a case
- Simple one-button operation for quick start up

The fully automatic, self-leveling Spectra Precision® Laser LL100 sets a new standard in rugged reliability, handling a wide variety of general construction applications. Even in the toughest jobsite conditions, the LL100 consistently delivers reliable, accurate performance to increase your overall productivity and cost-savings. The LL100 laser mounts on a tripod and sends a 360° plane of laser light over the entire work area, allowing one person to take accurate, self-leveled elevation measurements up to 150 m (500 ft) away with the HR320 laser receiver. The LL100 is designed to be durable and reliable, day in and day out, and features superior drop and weather protection. The tough LL100 laser can withstand drops of up to 1 m (3 ft) onto concrete and tripod tip-overs up to 1.5 m (5 ft). This ruggedness results in reduced downtime and lower repair costs. A tripod and grade rod is included with the laser, HR320 receiver, in one hard-shelled, portable, system carrying case. It's easy to transport, easy to carry, easy to store, and especially easy to use.

HV101

- Remote control offers scanning, speed control, slope setting, and alignment control for fast one person setups
- Beam is easily visible even in brightly lit interior conditions

The Spectra Precision® Laser HV101 is a professional tool with an economical price tag. Exceptional versatility allows it to handle a wide variety of horizontal, vertical and plumb applications. The HV101 laser transmitter is automatically self-leveled in the horizontal and vertical planes and sends a continuous 360-degree laser reference over the entire work area. The HV101 laser is easy to set up and use and is rugged enough for the toughest jobsite. Simple controls allow operators to carry out many functions with "one-touch" commands. A remote control offers scanning, speed control, slope settings, and alignment control for fast one person setups. Highly durable construction enables the HV101 laser to survive a drop of up to 1 m (3 ft) onto concrete. IP54 environmental sealing means the HV101 is unaffected by dust or moisture.

** Only for LL100 and HV101*

*** Available at authorized Spectra Precision dealers*

LL300 Laser**SPECIFICATIONS****Laser Source**

635 – 670 nm visible, Class 3A/3R

Laser Accuracy

±20 arc seconds
±2.2 mm per 30 m (±3/32 in per 100 ft)

Operating Receiver Range (Diameter)

400 m (1,300 ft)
w/HR350 Receiver

Self-Leveling Range

±5°

Compensation Method

Electronic Self Leveling

Power Source

4 x D Rechargeable NiCad or Alkaline Batteries

Battery Life

(20 °C / 68 °F)
Rechargeable NiCad: 45 hours, Alkaline: 90 hours

Battery Status LED

Flashing Red LED

Battery Recharging Time

Less than 10 hours

Rotation Speed

600 RPM

Out of Level (HI)-Warning

Rotor stops, red out-of-level LED blinks

Out of Level Warning at Receiver

Programmable at dealer
(with CR600 receiver only)

Machine Control Compatible

Yes

Protective Rotor Cage

Yes

Drop Height on Concrete

1 m (3 ft)

Single Axis Manual Slope Mode

Yes (w/self-leveling mode on the second axis),
with optional RC601 remote control

External Remote Control**(Operating Range)**

Up to 50 m
(164 ft)

Tripod Mount (Horizontal and Vertical)

5/8"–11

Operating Temperature

–20 °C to +50 °C (–4 °F to 122 °F)

Storage Temperature

–20 °C to +70 °C (–4 °F to 158 °F)

Warranty

2 years

Waterproof

Yes, IP54

Size

24.5L cm x 16.5W cm x 18.5H cm
(9.6L in x 6.5W in x 7.3H in)

Weight

2.7 kg (6 lb)

LL100 Laser**SPECIFICATIONS****Laser Source**

650 nm visible, Class 2

Laser Accuracy

±20 arc seconds
±2.2 mm per 30 m (±3/32 in per 100 ft)

Operating Range (Diameter)

w/HR320 receiver
1,000 ft (300 m)

Self-Leveling Range

±5°

Compensation Method

Electronic Self Leveling

Power Source

2 "D" alkaline

Battery Life

80 hours

Rotation Speed

600 rpm

Out of Level (HI)-Warning

Yes

Drop Height on Concrete

1 m (3 ft)

Single Axis Manual Slope Mode

Yes

Tripod Mount (Horizontal and Vertical)

5/8"–11

Operating Temperature

23 °F to 113 °F (–5 °C to 45 °C)

Storage Temperature

–4 °F to 158 °F (–20 °C to +70 °C)

Warranty

3-Year limited with instant exchange

Waterproof

Yes, IP54 sealing

Size

22L cm x 17W cm x 15 Hcm
(8.5L in x 6.7W in x 6.0H in)

Weight

1.5 kg (3.3 lb)

HV101 Laser**SPECIFICATIONS****Laser Source**

<5 mW @ 635 nm, Class 3A

Laser Accuracy

±20 arc seconds
±2.2 mm per 30 m (±3/32 in per 100 ft)

Operating Range

100 ft (30 m) minimum visual
1,000 ft (300 m) diameter with receiver

Self-Leveling Range

±5°

Compensation Method

Electronic Self Leveling

Power Source

2 x "D" Alkaline Batteries

Battery Life

50 hours Alkaline
45/25 hours user provided Ni-MH/Ni-CD

Battery Status LED

Flashing red LED

Rotation Speed

Four preset speeds 0, 50, 200, 600 RPM

Scan angles

Five preset angles 3°, 8°, 45°, 90°, 180°

Out of Level (HI)-Warning

Rotor stops, laser shuts off,
red out-of-level LED flashes

Operating Temperature

23 °F to 113 °F (–5 °C to 45 °C)

Storage Temperature

–4 °F to 158 °F (–20 °C to 70 °C)

Warranty

3 Year Limited with Instant Exchange

Waterproof

Yes, and IP54 sealing

Size

21.6L cm x 17.1W cm x 15.2H cm
(8.5L in x 6.7W in x 6.0H in)

Weight

1.5 kg (3.3 lb)



Spectra Precision® Laser LG20 crossbeam generator is ideal for level and plumb alignment of doors, windows, cabinets and more. Perform exterior leveling jobs such as decks and swimming pools with the addition of the HR250 receiver.

The LP20, LP40 and LP40-1 laser pointers are ideal for a range of positioning, and alignment applications; including layout of interior walls (drywall track installation), installation of overhead or floor fixtures, transferring points, checking plumb and square, and short-range leveling.

LG20

- The industry's brightest Crossbeam Generator features a biased upwards beam with easy-to-see lines for fast alignment and layout
- Water- mud- and shock-resistant for improved reliability and minimal repair cost
- Durable unit withstands a drop of up to 1 m (3 ft) onto concrete and still maintains consistent accuracy

The Spectra Precision Laser LG20 Crossbeam Generator can produce a single horizontal line, a single vertical line, or a simultaneous horizontal and vertical line. It can also be used with the optional HR250 receiver in a variety of line, vertical plumb, and general construction applications. The durable, versatile LG20 works like a hand tool and replaces a level, square, plumb bob, chalk line and optical instrument. Use the LG20 every day on every job to increase your jobsite accuracy and finish projects faster than ever!

LP20

- Highly visible, and durable self-leveling, dual-beam pocket laser for plumb up/down applications

Using the Spectra Precision® Laser LP20, one person can accurately transfer a point from the floor to the ceiling up to 30 m (100 ft) high in just seconds. Unlike other lasers, the LP20 can withstand up to a 1 m (3 ft) drop onto concrete and can still be accurate. Ideal for the installation of overhead fixtures and plumbing walls or metal studs, the LP20 is very easy to use. Simply place it on the floor and turn it on. LP20 features a self-leveling mechanism which automatically levels the beam before you reach the top step of the ladder. Waiting for a plumb bob to settle is a thing of the past!

LP40

- Rugged self-leveling, four-beam pocket laser for plumb up/down, level and square applications

The versatile Spectra Precision® Laser LP40 is a self-leveling plumb up/down, level and square beam pocket laser. Offering unmatched durability, the versatile LP40 is ideal for a range of applications including installing fixtures, putting in walls and leveling foundations. The LP40 projects four beams up to 30 m (100 ft) and can withstand a drop of up to 1 m (3 ft) onto concrete and still provide consistent accuracy. One beam points up while another points down to create a plumb up and plumb down reference. The other two beams are offset at 90 degrees to each other, pointing out horizontally to create level and square reference points. The LP40 features a self-leveling mechanism for consistent repeatability so you can be sure your positioning is accurate. Built-in magnets allow the LP40 to be attached directly to drywall track.

LP40-1

- All the features and benefits of the LP40 plus a complete set of universal mounting accessories packed in a case

The versatile Spectra Precision® Laser LP40-1 is the same as the LP40, but includes accessories. Additional accessories such as the universal mount allow a contractor to use the LP40 for the installation of acoustic ceilings, or attach the LP40-1 directly to steel studs or columns for elevations and 4 ft marks. The universal mount allows the unit to be attached to a ¼ x 20 mounting thread for additional applications. The LP40-1 contains the LP40 in a hard carrying case with the universal mount, red laser glasses, metal ceiling grid plate, pouch, 2 red flex targets, and multi-language operator's manuals.

LG20

SPECIFICATIONS

Leveling method
Self-leveling

Out of level indicator
Yes

Working range
30 m (100 ft) visual, 75 m (250 ft) with the HR250 receiver

Accuracy
6 mm at 21 m (1/4 in at 70 ft) level and vertical beams

LP Series

SPECIFICATIONS

Leveling method
Self-leveling

Out of level indicator
Yes

Working range
30 m (100 ft) visual

Accuracy
6 mm @ 21 m (1/4 in @ 70 ft) for up beam,
6 mm @ 30 m (1/4 in @ 100 ft) for level and square beams,
1 mm @ 0.5 m (1/16 in @ 2.5 ft) for down beam



- 2" Accuracy, with selectable 1" or 5" display resolution
- Vertical axis compensated, with programmable compensator On/Off
- Dual, backlit LCD displays & controls
- Large, easy-to-read LCD characters
- Backlit scope reticle
- Full suite of parameter settings: Degrees, Mil, Gon, V%, Zenith Angle, Auto Shut-off, Horizontal Angle Beep, etc.
- Water and dust resistant
- Rechargeable kit and backup alkaline battery pack included

Designed for general construction applications, the DET-2 electronic digital theodolite gives you accurate measurements in an affordable, versatile, easy to use platform. The DET-2 has Dual Displays and Controls for easy accessibility and operation, very large backlit LCD characters for easy reading, and a host of features and parameters normally found on much higher priced instruments.

Fast investment payback is the goal of the DET-2, with its 2" accuracy (1" or 5" selectable display readings) and vertical axis compensation. Operating costs are kept low with the included rechargeable battery pack and charger and a long, 36 hour battery life. A backup alkaline pack holding 4 standard AA batteries is also included to eliminate downtime if the charge is lost in the middle of a job.

Every DET-2 is fully customizable for your preferred operating style or job, with programmable settings for the horizontal angle resolution and beep, vertical degrees or %, automatic shutoff (to save battery life), Zenith angle, and the vertical axis compensation (tilt On/Off).

You can count on working in difficult conditions with the DET-2. In addition to the dual large character, backlit LCD's, the DET-2 has a built-in reticle illuminator that allows you to work inside buildings and other environments with little or no light, such as near dawn or dusk. Finally, the instrument has a full IP-54 rating, meaning water can splash on them from any direction with no harmful effects.

TELESCOPE

Image
Erect
Magnification
30x
Aperture
45 mm (1.7 in)
Angle of view
1° 30'
Shortest distance
1.35 m (4.43 ft)
Stadia constant
100
Resolution
3"

ANGLE MEASURING SYSTEM

Angle measurement
Incremental
Min. Reading
1" or 5"
Detection
Horizontal Angle - Right or Left
Precision
2"
Unit of angle
Deg / mil / gon / V %
Display
LCD both sides

TILT SENSOR

Automatic Compensation
Yes
Range of compensation
±3'

OPTICAL PLUMMET

Image
Erect
Magnification
3X
Angle of view
5°
Focusing range
0.5 m to ∞ (1.6 ft to ∞)
Reticle type
Crosshair

VIALS

Tubular vial
30"/2 mm
Circular vial
8'/2 mm

RANGE

Temperature
-20 °C to +50 °C
(-4 °F to +122 °F)

POWER

Battery type
4 x AA alkaline or NiMH Pack
Voltage
4.8
Battery Life
36 hours

ENVIRONMENTAL

Dust / Water Protection
IP54
Weight
4.5 kg (9.9 lb)
Size
164 mm x 154 mm x 340 mm
(6.4 in x 6.1 in x 13.4 in)
Warranty
1 Year



- Choice of magnification: 24x or 28x
- Choice of magnetic or air-dampened automatic compensators
- Double-sided, continuous horizontal tangent drives
- Stadia lines for simple distance measurement
- Convenient horizontal angle measurement
- Built-in bubble mirror and optical sighting alignment
- Metal housing increases durability
- Water resistant construction

The AL2X-X series automatic levels are designed for a variety of elevation control and alignment tasks including general building construction, cut and fill measurements, area leveling, and landscaping.

The levels are easy to set up and attach quickly to flat or domed head tripods. An adjustable built-in bubble mirror can be tilted for easy viewing of the circular bubble in any position. A built-in optical peep sight and double-sided endless tangent drives allow for easy targeting and operation with either hand.

Reliable automatic compensators ensure stability and accuracy in the line of sight. Telescope optics are bright and clear providing sharp images for ease of viewing. A short focusing distance provides for better performance in tight spots or on steep slopes. Stadia lines on the reticle make distance calculations easy. Angle measurements are quick and convenient with the horizontal scale located directly below the eyepiece.

Rugged metal housings provide increased durability. Weather resistant housing design and rubber and plastic controls ensure the instruments can continue working even in adverse environmental conditions. All models include a hard-shell carrying case, plumb bob, rain hood, allen wrench, adjusting pin, and manual.

SPECIFICATIONS	AL24A / M	AL28A / M	AL28M-G
TELESCOPE			
Image	Erect	Erect	Erect
Magnification	24x	28x	28x
Objective aperture	30 mm (1.2 in)	30 mm (1.2 in)	30 mm (1.2 in)
Field of view	1° 20"	1° 20"	1° 20"
Minimum focusing distance	0.60 m (1.97 ft)	0.60 m (1.97 ft)	0.60 m (1.97 ft)
Stadia ratio	100	100	100
Additive constant	0	0	0
LEVEL VIAL SENSITIVITY			
Circular level	8' / 2 mm	8' / 2 mm	8' / 2 mm
STANDARD DEVIATION (1 km double-run leveling)			
	±2.0 mm	±1.5 mm	±1.5 mm
AUTOMATIC COMPENSATOR			
Type	Wire hung A = Air Damper M = Magnetic Damper	Wire hung A = Air Damper M = Magnetic Damper	Wire hung Magnetic Damper
Working Range	± 15'	± 15'	± 15'
Setting Accuracy	0.5"	0.5"	0.5"
HORIZONTAL CIRCLE			
Minimum increment	360° 1°	360° 1°	400 gon 1 gon
DIMENSIONS (L X W X H)			
Instrument – mm (inch)	130 x 190 x 135 (5.1 x 7.5 x 5.3)	130 x 190 x 135 (5.1 x 7.5 x 5.3)	130 x 190 x 135 (5.1 x 7.5 x 5.3)
Carrying Case – mm (inch)	170 x 280 x 190 (6.7 x 11 x 7.5)	170 x 280 x 190 (6.7 x 11 x 7.5)	170 x 280 x 190 (6.7 x 11 x 7.5)
WEIGHT – KG (LB)			
Instrument	1.6 (3.5)	1.6 (3.5)	1.6 (3.5)
Carrying Case	1.25 (2.75)	1.25 (2.75)	1.25 (2.75)

FOCUS 30 ACCESSORIES

POWER SUPPLY

Charger dual battery
Battery Li-Ion 11.1V

MISCELLANEOUS

Transport case
Tribrach

CABLES

Cable 1.5m data download

EPOCH 35 ACCESSORIES

POWER SUPPLY

Receiver charging bundle
Battery

CABLES

Cable 1.5 m data
Cable for LPB radio
Cable for HPB radio

SOFTWARE

Spectra Precision Survey Office
Complete (L1/L2)
Spectra Precision Survey Office
Upgrade to complete module
Spectra Precision Survey Office
no dongle

MISCELLANEOUS

Transport Case
Extension pole

EPOCH 10 ACCESSORIES

CASES

Kit case
Receiver pouch

POWER SUPPLY

1.2 m antenna cable

FOCUS 8 & FOCUS 6 ACCESSORIES

POWER SUPPLY

On-board Li-Ion battery
Dual battery charger
AC adaptor for battery charger

MISCELLANEOUS

Transport case

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

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

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



Pacific Crest



- Field-proven, familiar technology
- High Power Base Kits
- Low Power Base Kits
- PDL Repeaters
- PDL Covers
- Accessories
- Replacement Parts

Positioning Data Link (PDL) radio kits and communication products from Pacific Crest provide the critical connection between the GNSS reference station and other GNSS user equipment. Pacific Crest PDL units are compact, lightweight and power-efficient. The unique design of these units allows them to be mounted easily on all standard tripods and range poles.

Pacific Crest PDL radios are turnkey solutions for RTK data links that easily integrate with most major GNSS OEM equipment. The data link features a 19,200 bps data rate and flexible transparent or packet-based protocol. Waterproof and all-weather operational, PDL modems, kits and accessories help you increase productivity in the field no matter where you are since they are compatible with GNSS RTK equipment.

MODELS OVERVIEW	PDLLPB	PDLHPB
GENERAL SPECIFICATIONS		
DTE-DCE Interface User Interface	3 Wire, RS-232, 38.4 k Baud Max On/Off Button Auto Power On feature included Channel Button with AutoBase™ and AutoRover Digital Display Modem/Power Status Indicators	3 Wire, RS-232, 38.4 k Baud Max On/Off Button Auto Power On feature included Channel Button with AutoBase™ and AutoRover™ Digital Display Modem/Power Status Indicators RF Power Select Toggle Switch
POWER		
External	9–16 V DC	9–16 V DC
Internal Battery	N/A	N/A
During TX (nominal)	11 W	110 W
During RX (nominal)	0.9 W	1.9 W
ANTENNA		
External/Connector	External 50 Ohm, NMO	External 50 Ohm, BNC
MODEM SPECIFICATIONS		
Link Rate/Modulation	19,200 bps/4 Level FSK (25 kHz) 9600 bps/4 Level FSK (12.5 kHz) 9600 bps/GMSK (25 kHz) 4800 bps/GMSK (12.5 kHz)	19,200 bps/4 Level FSK (25 kHz) 9600 bps/4 Level FSK (12.5 kHz) 9600 bps/GMSK (25kHz) 4800 bps/GMSK (12.5kHz)
Link Protocols	Transparent, Packet Switched, Digipeater, TrimTalk	transparent, Packet Switched Digipeater, TrimTalk
Forward Error Correction	Yes	Yes
RADIO SPECIFICATIONS		
Frequency Bands	430–450 MHz, 450–470 MHz	430–450 MHz, 450–470 MHz
Frequency Control	Synthesized 12.5 kHz Resolution ±2.5 ppm Stability	Synthesized 12.5 kHz Resolution ±2.5 ppm Stability
RF Power Select	Factory Set	Low/High
RF Transmitter Output	0.5/2 Watts	2/35 Watts Maximum
Sensitivity	–110 dBm BER 10 ⁻⁵	–110 dBm BER 10 ⁻⁵
Adjacent Channel Selectivity	>65 dB (25 kHz), >55 dB (12.5 kHz)	>65 dB (25 kHz), >55 dB (12.5 kHz)
Type Certification	All models are type accepted and certified for operation in the U.S. and Canada	
ENVIRONMENTAL SPECIFICATIONS		
Operating Temperature	–22 to +140 °F (–30 to +60 °C)	–22 to +140 °F (–30 to +60 °C)
Storage Temperature	–67 to +185 °F (–55 to +85 °C)	–67 to +185 °F (–55 to +85 °C)
Vibration/Shock	ANSI/ASAE EP455	ANSI/ASAE EP455
Enclosure	IEC 144/855420 IP 66 Watertight and Dustproof	IEC 144/855420 IP 66 Watertight and Dustproof
MECHANICAL SPECIFICATIONS		
Dimensions	8.25" L x 2.40" Diameter (21.0 cm L x 6.1 cm Diameter)	6.23" W x 2.77" H x 6.58" L (15.8 cm W x 7.0 cm H x 16.7 cm L)
Weight	0.65 lb (0.30 Kg)	2.96 lb (1.34 Kg)
Data Power Connector	5-pin LEMO #0 Shell	5-pin LEMO #1 Shell
Mounting Options	5/8"–11 Range Pole	Tripod Bracket

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Contact your local dealer: