SOKKIA

Series230RM

Auto-Pointing Reflectorless Total Stations

Laser beam image is simulated.
Remotocatcher system is a factory option.

Series230RM

Innovative technology takes reflectorless EDM to a whole new standard

Featuring exclusive RED-tech II EDM technology for pinpoint reflectorless measurement over an ultra-wide range with survey-grade accuracy.

Upgrade to complete remote control operation

Sokkia's own Remotocatcher system adds full remote control operation from the prism side for dramatically improved single-operator productivity in the field.

Auto-pointing start

Auto-pointing finish

Easy-to-use auto-pointing function for swift, highly accurate surveying

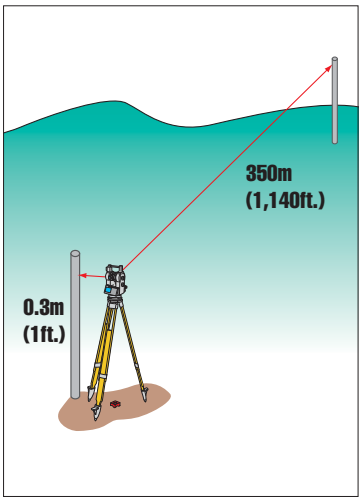
Point the instrument roughly toward a prism, press a button, and the Series230RM takes care of the rest.

Innovative Technology Takes Reflectorless EDM to a Whole New Standard

EDM technology takes a big leap forward with state-of-the-art RED-tech II EDM

Pinpoint reflectorless measurement over an ultra-wide range

RED-tech II EDM retains the best of first-generation RED-tech EDM technology —including close-range reflectorless measurement from just 0.3m (1ft.)—and takes it to a whole new level of performance.



● Reflectorless measurement range from 0.3m to 350m (1ft. to 1,140ft.)

The Series230RM offers reflectorless measurement from as close as 0.3m (1ft.) to 350m (1,140 ft.) for precise measurement over a tremendous range of distances, while assuring survey-grade accuracy.

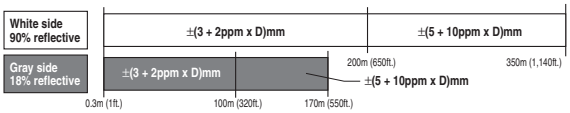
● High-speed measurement now over 30% faster*

Measurement is fast at every 0.9 second and just 1.7 seconds for the initial measurement (in fine mode) for speed gains of over 30%.

* According to in-house tests.

● Reflectorless measurement range and accuracy with a Kodak Gray Card

Class 3R laser products

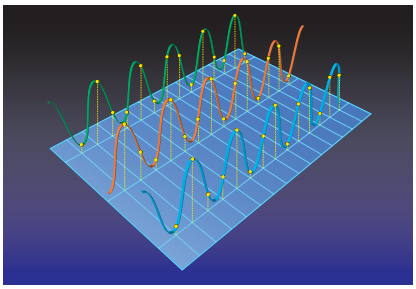


● Distance measurement speed

RED-tech II
REvolutionary Digital processing EDM technology

The proven technology behind RED-tech II EDM

RED-tech II EDM is a high-performance phase-comparison measuring system that delivers unprecedented distance measurement of a variety of objects under conditions difficult or impossible with other EDMs.



● Phase-comparison measurement

RED-tech II EDM uses phase comparison technology, which provides notable advantages in accuracy compared with EDMs using pulse measurement methods. Combined with Sokkia's leading edge digital signal processing technology and refined optics, superbly accurate reflectorless measurement is now a reality.

● Digital signal processing

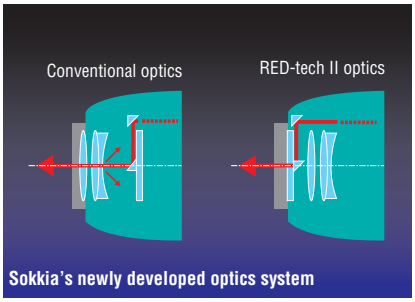
RED-tech II EDM simultaneously samples measuring signals in three different frequencies and calculates distances using advanced digital signal processing software. A calculation method best suited to the condition of the measuring signals is selected, and receiving signals are amplified to ensure a high level of reliability. Thanks to leading-edge signal processing techniques, RED-tech II EDM delivers superior accuracy and with greater speed and efficiency compared with conventional EDMs.

● High-precision optics

Sokkia has further refined its traditional optics system, which emits measuring light from the objective lens center and receives the returning light along its periphery.

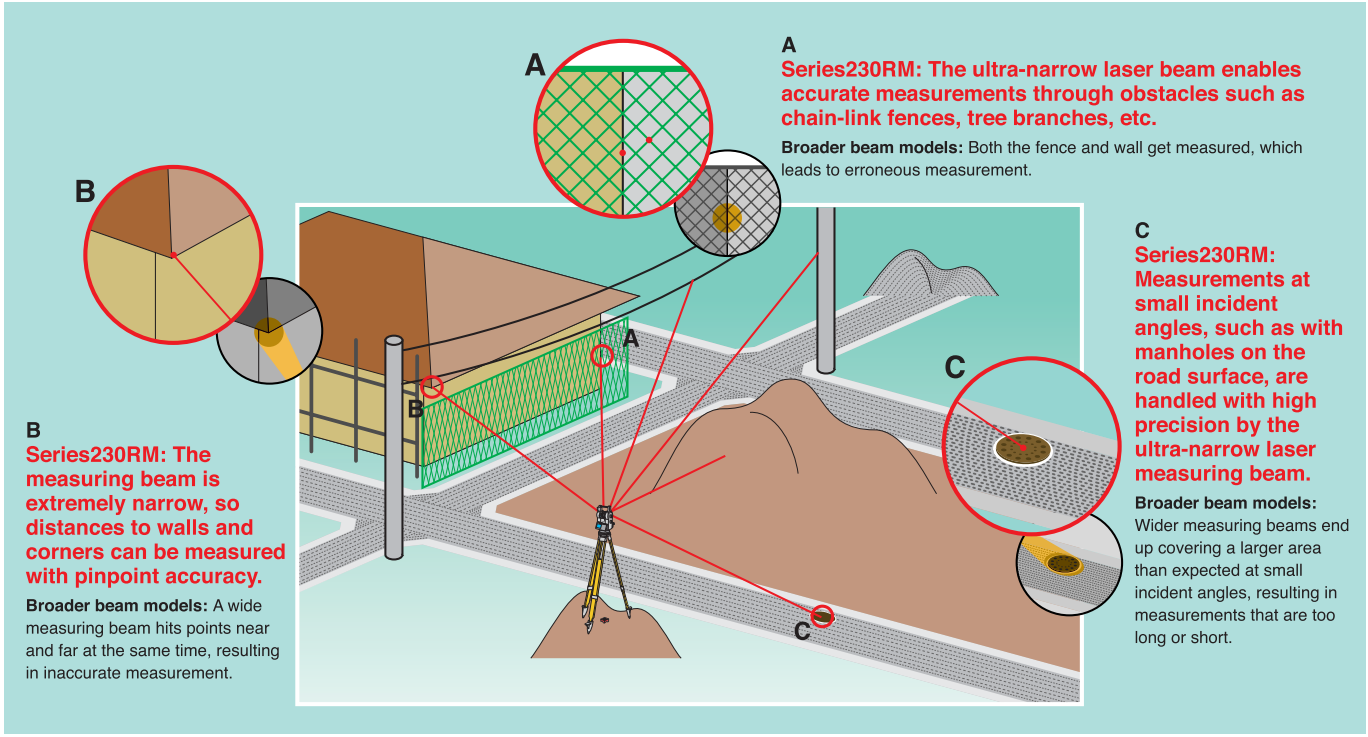
Now with enhanced optics that provide the ideal light path, the new design dramatically increases reliability by emitting the laser beam from in front of the objective lens to eliminate errors caused by internal reflection. And its highly tunable optical components ensure that only the necessary returning light is directed to the receiver for faster, more efficient measurement. What's more, the telescope provides an extremely bright and sharp sight, and its compact size makes sighting easier than ever.

With its one light source, with its one optics system, an ultra-narrow visible laser beam is emitted along the same axis as the telescope's sighting axis to enable accurate pointing using a distinct laser spot, pinpoint reflectorless measurement, as well as long-range distance measurement using prisms or reflective sheet targets.



Series230RM

Ultra-narrow visible laser for pinpoint accuracy



The Series230RM employs an ultra small-diameter visible laser to obtain measurements with pinpoint accuracy. Fine objects, as well as the corners of walls and other structures, can be measured precisely. You can also make accurate measurements through obstacles such as chain-link fences and tree branches.

Laser-pointer function

The visible laser beam can be conveniently used as a laser pointer for interior leveling work, vertical alignment, setting out, and other tasks.

Long-distance measurement with reflectors

Measure long distances by directing the laser beam at a reflector. When using a single AP prism, you can measure as far as 5,000m (16,400ft.)* at once, with an accuracy of ±(2 + 2ppm x D)mm. In addition, reflective sheet targets may be used to get measurements of up to 500m (1,640ft.)** with ±(3 + 2ppm x D)mm precision. Choose from Sokkia's wide selection of sheet targets to suit your needs. Rotating pin-pole targets, two-point target for measuring hidden points, and many other innovative reflective targets are available.

* In good weather conditions. ** When using RS90N-K.

In the reflective sheet or prism modes, maximum laser output is automatically reduced to 0.22mW. This is equivalent to the level of a Class 1 laser. The Series230RM also includes a safety filter in the telescope, which protects your eye from the laser beam if you happen to sight a reflective prism or sheet target while in reflectorless mode.

Easy-to-Use Auto-Pointing Function for Swift, Highly Accurate Surveying

Pointing, measuring, and display of results—all performed with a single touch of a key!

Point the telescope in the general direction of the prism through the peep sight, then simply press the measuring key. The Series230RM will automatically point, measure, and then display the results instantaneously. The automatic pointing system eliminates the need to look through the telescope, and no focusing is necessary. Therefore, even an inexperienced operator can make highly accurate measurements.

● Fast, accurate, and extremely easy to use for anyone

Get precise measurements with ± 2.5mm accuracy for distances up to 100m (320ft.) and 5" for longer range distances. Because the instrument takes care of focusing, even inexperienced operators can achieve pinpoint results.

● Reduced operator stress

Eyestrain is relieved, as looking through the telescope is no longer necessary. And survey work is extremely facilitated as physical stress is relieved.

● Automatic pointing for long distances

A distance up to 800m (2,600ft.) with a single prism and a distance up to 300m (980ft.) with a pin-pole target can be pointed automatically.

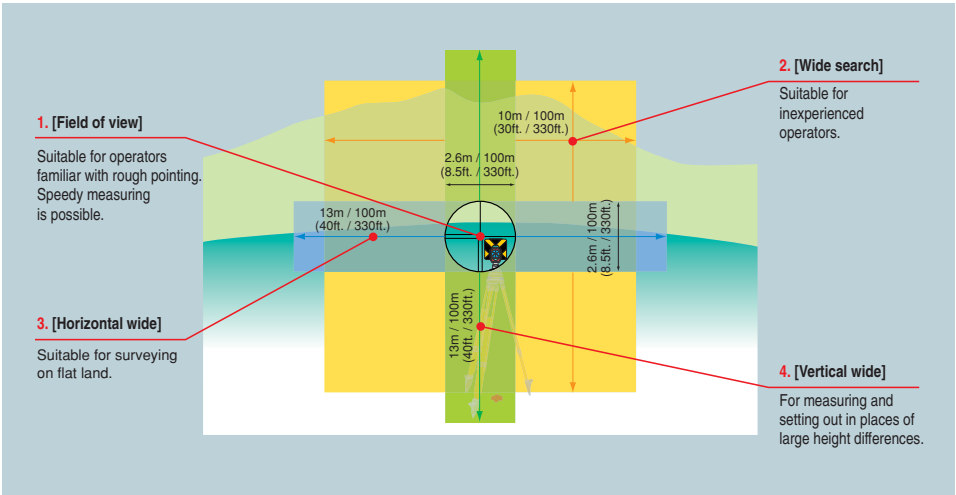
● Automatic pointing made easy under low-light conditions

The Series230RM will accurately and quickly point to an object even under unfavorable low-light conditions at dusk or at dawn.

● User-selectable Fine/Rapid modes

Select from two auto-pointing modes (Fine/Rapid) depending on your application. For detailed surveys, choose Fine mode. Or use Rapid mode when efficiency is priority.

A wide area for automatic pointing



The automatic pointing search area is not limited to inside the telescope sight range. By selecting a wide search area, even an inexperienced operator can make accurate measurements. When operating the Series230RM using a wireless controller from the prism side, the prism can be easily pointed by utilizing these various search area options.

Ultra-reliable motor drive mechanism

● Equipped with Sokkia's original drive mechanism and control algorithm

Highly accurate automatic pointing and angle positioning are made possible thanks to the original gear reduction mechanism and the control algorithm using angle information obtained directly from the angle-measuring encoders.

● Jog dial (variable speed Fine/Coarse dial)

Equipped with a Fine/Coarse variable speed jog dial for adjusting vertical and horizontal rotation, the feed rate changes automatically depending on how fast the dial is turned.

● Self-locking free rotation mechanism accelerates job efficiency

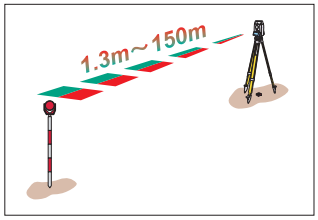
For enhanced handling efficiency, the mechanical clamps have been replaced with a self-locking mechanism that automatically locks the telescope position. Also, the free rotation mechanism enables the operator to freely rotate the telescope by hand.

Series230RM

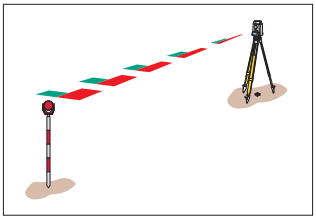
Highly Practical Hardware Features For Enhanced Productivity

Guide light unit

The guide light unit boosts efficiency with setting-out jobs. Its guide light is composed of two lights of different colors that are emitted from one aperture. From the left side, you see only a green light; from the right, only a red light. When you see green and red flashing back and forth simultaneously, that means you are on the telescope sighting direction. The guide light unit has a range of up to 150m (490ft.). A special flashing pattern is also included to assist users with color weakness.



The light may be used up to a range of 150m (490ft.).

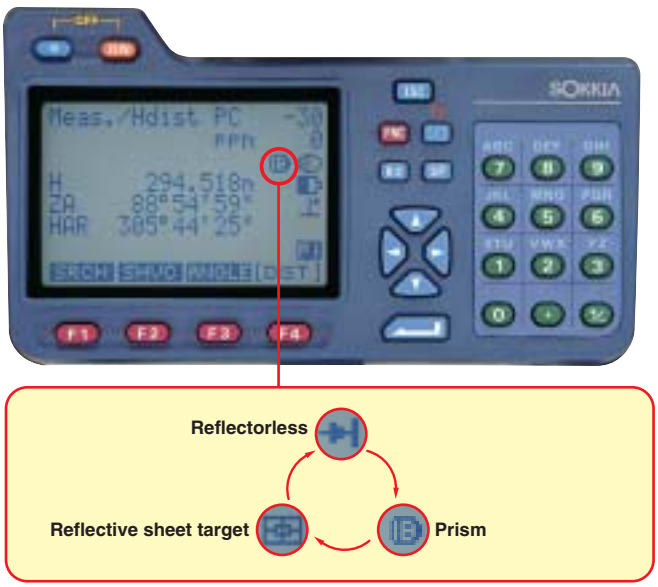


A special flashing pattern is also included to assist users with color weakness.

- **Dual-axis compensator compensates for vertical and horizontal angles, and the collimation function corrects the deviation of the telescope's mechanical axis.**
- **A password function lets you define your own password to prevent unauthorized use.**
- **The large internal memory stores approx. 10,000 data points.**
- **Two standard-equipped, high-capacity Ni-MH batteries enable you to perform a full day's work on a single charge.**

User-friendly operation

The control panel on Face 1 features a large, easy-view display and a 10-key alphanumeric keypad. Four built-in softkeys (F1 - F4) can be customized to perform functions of your choice. Target mode can be easily selected from “reflectorless”, “prism”, and “reflective sheet” options by pressing the SFT key in sequence. For further convenience, a trigger key is installed on Face 2.

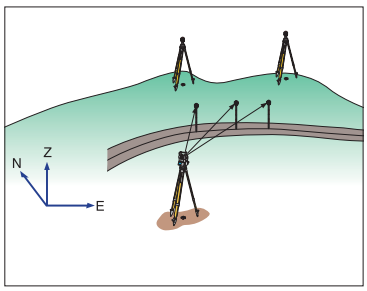


Compensator | % | LCD Level | Guide Light | Remote Control | Memory 10,000points | RS-232C | Battery Ni-MH

Versatile Functions for High Work Efficiency

Motor-driven, for unmatched productivity

● **Setting out**



Set Out

Thanks to a motor drive mechanism, the Series230RM can automatically rotate to the direction of set out positions. With the help of the standard-equipped guide light unit, setting out tasks can be performed quickly. The order of setting out points can be sorted in a number of ways, including: horizontal angle right / follows counterclockwise / starting in order of the points at the shortest distance from the instrument station.

● **Includes a host of other useful functions**

Missing Line | REM | Coordinate | Auto Azimuth | Resection | Offset | Offset | Offset | Area

Upgrade to Complete Remote Control Operation

The greatest benefit of a motor-driven total station is complete remote control from the prism side. When combined with Sokkia's exclusive Remotocatcher system*, all Series230RM functions can be performed from the prism position via remote control for ultra-reliable measurement and dramatically enhanced surveying efficiency.

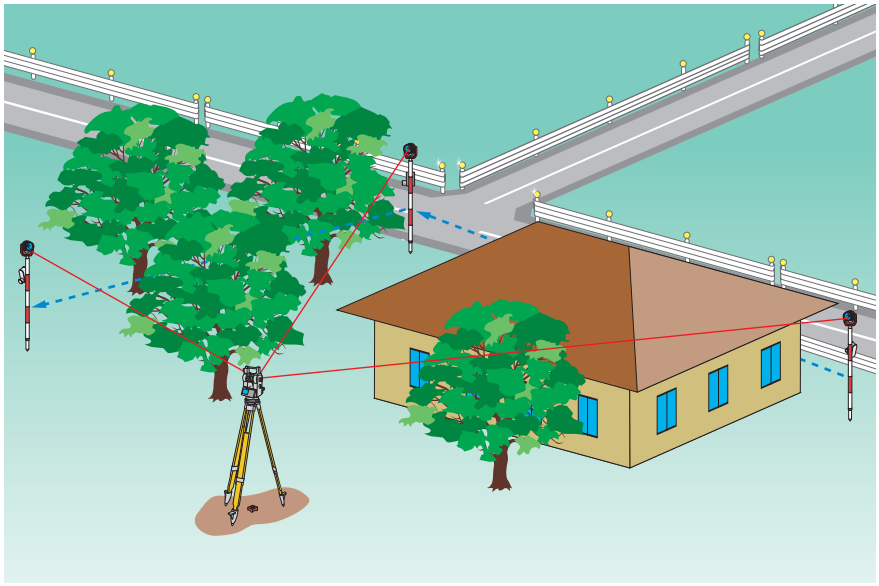
Remotocatcher

The Remotocatcher system consists of an RC controller that emits a fan-shaped laser beam from the prism side and a beam detector unit incorporated in the Series230RM. In conjunction with radio modems and a data collector, the Remotocatcher facilitates complete remote control of the Series230RM.

*The Remotocatcher system is a factory option. Radio modems and data collector are not included with the Remotocatcher system. For more information on radio modems and data collectors, please consult your local sales representative.

Stress-free target acquisition

The innovative Remotocatcher system eliminates operator stress thanks to Sokkia's exclusive remote target acquisition technology.



● "On-demand" target acquisition

Unlike tracking, Remotocatcher is an "on-demand" system, sending turn and locate commands to the instrument only when a measurement is desired. Because constant target tracking is not necessary, obstacles between measuring points do not interrupt your work.

● Smart pointing with rotation direction detector

To make target acquisition dramatically fast, the Remotocatcher detects the direction in which the prism is moving, and instructs the Series230RM to rotate in the appropriate direction to locate the prism.

● Laser beam with wide range

As the fan-shaped laser beam emitted from the RC controller has a wide range, the Series230RM can locate prism position with outstanding speed.

Works with prisms you already have

No special prism is needed for the Remotocatcher system. Just set up the RC controller on your prism pole and point roughly towards the instrument.

No external battery necessary

The use of the Remotocatcher system does not increase the power consumption of the Total Station. As a power source, the standard detachable batteries supplied will be more than sufficient for all your Remotocatcher operation needs.

Range*	Standard Mode	2 to 150m (7 to 490ft.)
	Far Mode	2 to 300m (7 to 980ft.)
RC Controller (RC-PR2)	Horizontal angle	-10 to +10˚
Beam projection area	Vertical angle	More than 30˚

*Slope distance between instrument and measuring point.
Using Sokkia's reflective prism target during good atmospheric conditions.

Series230RM Auto-Pointing Reflectorless Total Stations

SET3230RM · SET4230RM

SPECIFICATIONS

Model			SET3230RM	SET4230RM
Telescope			Fully transiting, coaxial sighting and distance measuring optics	
			Length: 171mm (6.7in.), Objective aperture: 45mm (1.8in.) (EDM 48mm (1.9in.)), Magnification: 30x, Resolving power: 2.5", Image: Erect, Field of view: 1°30' (26m/1,000m), Minimum focus: 1.3m (4.3ft.), Reticle glass: ∞ mark printed, Reticle illumination: 5 brightness levels	
Angle measurement			Photoelectric incremental rotary encoder scanning with 0 index	
Unit			Degree / Gon / Mil, selectable	
Display resolutions (selectable)			1" / 5", 0.2 / 1 mg, 0.005 / 0.02 mil	
Accuracy (ISO17123-3:2001)			3" / 1mg / 0.015mil	5" / 1.5mg / 0.025mil
Measuring time			Less than 0.5sec., continuous	
Measurement mode		H	Clockwise / Counterclockwise, selectable. 0 set, Hold, Angle input, available.	
		V	Zenith 0 / Horizontal 0 / Horizontal 0 ±90 / Slope in %, selectable	
Automatic dual-axis compensator			Dual-axis liquid tilt sensor, Working range: ± 3' (± 55mg), out-of-range warning display provided	
Collimation compensation			On / Off, selectable	
Distance measurement			Modulated laser, phase comparison method with red laser diode, coaxial optics	
Signal source			Red laser diode (690nm), Class 3R Laser Product*1	
Laser output			Reflectorless mode: Class 3R (max. 5mW) Prism/Sheet mode: Class 1 equivalent (max. 0.22mW)	
Unit			Meters / feet / inches, selectable	
Measuring range*2 (slope distance)	Reflectorless*3 (using Kodak Gray Card)		0.3 to 350m (1 to 1,140ft.) (White side, 90% reflective) 0.3 to 170m (1 to 550ft.) (Gray side, 18% reflective)	
	With reflective sheet target		RS90N-K: 1.3 to 500m (1,640ft.), RS50N-K: 1.3 to 300m (980ft.), RS10N-K: 1.3 to 100m (320ft.)	
	With mini prisms		CP01: 1.3 to 800m (2,620ft.), OR1PA: 1.3 to 500m (1,640ft.)	
	With 1 AP prism		1.3 to 4,000m (13,120ft.), Under good conditions*4: 1.3 to 5,000m (16,400ft.)	
	With 3 AP prisms		to 5,000m (16,400ft.), Under good conditions*4: to 6,000m (19,680ft.)	
Display resolutions			0.001m, 0.01ft., 1/8in. (Tracking:0.01m, 0.1ft., 1/2in.)	
Accuracy (D=measuring distance, unit:mm)	Reflectorless*3/*5		Fine mode: 0.3 to 200m (1 to 650ft.): ± (3 + 2ppm x D)mm, Over 200 to 350m (over 650 to 1,140ft.): ± (5 + 10ppm x D)mm Rapid single mode: 0.3 to 200m (1 to 650ft.): ± (6 + 2ppm x D)mm, Over 200 to 350m (over 650 to 1,140ft.):± (8 + 10ppm x D)mm	
	With reflective sheet target		Fine mode: ± (3 + 2ppm x D)mm / Rapid single mode: ± (6 + 2ppm x D)mm	
	With AP prism		Fine mode: ± (2 + 2ppm x D)mm / Rapid single mode: ± (5 + 2ppm x D)mm	
Measuring time			Fine mode: every 0.9s (initial 1.7s) / Rapid single mode: 1.4s / Tracking: Every 0.3s (initial 1.4s)	
Measuring mode (selectable)			Fine (single / repeat / average), Rapid (single), Tracking	
Atmospheric correction / Prism constant correction			Temperature / Pressure / ppm input, available. / -99 to +99mm (1mm steps). 0 fixed in reflectorless mode.	
Refraction & earth-curvature correction			ON (K=0.142 / 0.20) / OFF, selectable	
Motor drive			DC motor drive with self-locking free rotation system	
Motion range	H & V		360°	
Rotating time:			Less than 10sec. for 180° rotation (compensator off)	
Fine motion			Variable speed jogging knobs	
Auto-pointing			Pulse Laser transmitter and CCD detetor with co-axial optics	
Signal source			Laser diode (785nm), Class 1 Laser Product*1	
Distance range	With OR1PA pinpole prism		2.0 to 300m (6.5 to 980ft.)	
	With CP01 compact prism		2.0 to 400m (6.5 to 1300ft.)	
	With one AP01 prism		2.0 to 800m (6.5 to 2600ft.)	
Auto-pointing accuracy			Better than 2.5mm (0.1in.) up to 100m (330ft.) / Better than 5" (1.5mgon.) over 100m (330ft.)	
Auto-pointing time*6			3 to 6sec. typically (with a prism at 100m distance)	
Guide light				
Light source			Red LED (630nm) and Green LED (524nm), Class 1 LED Product*1	
Visible range*6	Distance		1.3 to 150m	
	Visible width		Right and Left/Upward and Downward: about ± 4°(about 7m/100m)	
	Resolving power at center area (width)		less than about 4'(about 0.12m/100m)	
Data storage and transfer				
Data storage			Approx. 10,000 points	
Calendar clock			Provided	n/a
Interface			Asynchronous serial RS-232C compatible, Baud rate: 1,200 to 38,400bps	
General				
Display			Alphanumeric / graphic dot matrix LCD, 20 characters x 8 lines, on single face (Face 1) with backlight	
Keyboad	Face1		Alphanumeric, 28 keys	
	Face2		Trigger key, 1 key	
Laser-pointer function			ON (auto off in 5 minutes) / OFF, selectable. (Does not work simultaneously with the Guide Light.)	
Laser radiation indicator			Yes	
Sensitivity of levels	Plate level		30" / 2mm	
	Circular / Graphic		Circular level: 10' /2mm / Graphic LCD level: 3' / outer circle	
Optical plummet			Image: Erect, Magnification: 3x, Minimum focus: 0.5 m (1.6ft.)	
Tribrach			Detachable	
Dust and water protection / Operating temperature			Conforms to IPX2 (IEC 60529:1989) / -20 to +50°C (-4 to +122°F)	
Instrument height / Size with handle and battery			245mm (9.6in.) from tribrach bottom / W 202 x D 171 x H 380mm (W 8.0 x D 6.7 x H 15in.)	
Weight with handle and battery			Approx. 7.0kg (15.4lb.)	
Power supply				
BDC45 detachable battery			Ni-MH rechargeable battery, 2 BDC45 are included as standard accessories.	
	Continuous use at 25°C (77°F)*7		About 3.5hours per battery	
	Recharging time		About 130minutes per battery	
BDC7 external Ni-Cd battery (optional)	Continuous use at 25°C (77°F)*7		About 7hours	
Automatic power cut-off			30 minutes after operation / OFF, selectable	

*1 IEC 60825-1Amd.2: 2001 / FDA CDRH 21 CFR Part1040.10 and 1040.11 (Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No.50, dated July 26, 2001.)
*2 Average conditions: Slight haze, visibility about 20km (12 miles), sunny periods, weak scintillation.
*3 Reflectorless range/accuracy may vary according to measuring objects, observation situations and environmental conditions.
*4 Good conditions: No haze, visibility about 40km (25 miles), overcast, no scintillation.
*5 With Kodak Gray Card White Side (90% reflective)
*6 Values vary according to the environmental conditions.
*7 Fine single measurement by face 1 and 2, every 30 sec., using auto-pointing function.

Sokkia is a sponsor of the International Federation of Surveyors

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