SOKKIA

Series 130R

Reflectorless Total Stations

Superior Range, Speed & Accuracy

EXPAND YOUR REACH WITH REFLECTORLESS RANGE FROM 0.3M TO 350M / 1FT. TO 1,140FT.

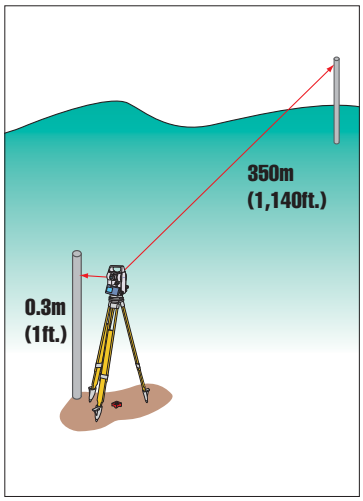
Laser beam image is simulated.
Guide Light Unit is a factory option.

Innovative Technology Ma

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

Pinpoint reflectorless measurement over an ultra-wide range

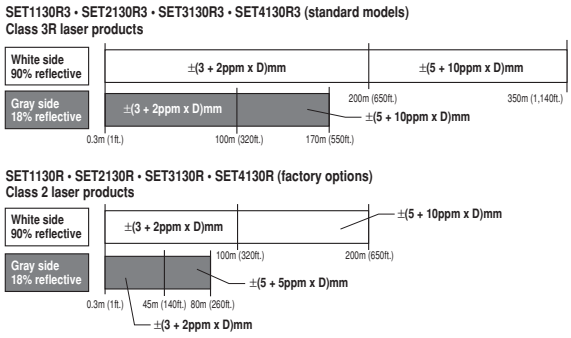
RED-tech II EDM retains the best of first-generation RED-tech EDM technology —including close-range reflectorless measurement from just 0.3m (1ft.)—and takes it to a whole new level of performance.



● 350m or 200m—choose the range you need

The Class 3R laser models provide reflectorless measurement up to 350m (1,140 ft.), while the Class 2 laser models cover a range up to 200m (650ft.). All models offer measurement from as close as 0.3m (1ft.) for reflectorless measurement over a tremendous range of distances, while assuring survey-grade accuracy .

● Reflectorless measurement range and accuracy with a Kodak Gray Card



● 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%.

* Compared with first-generation RED-tech EDM models.

● Distance measurement speed

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

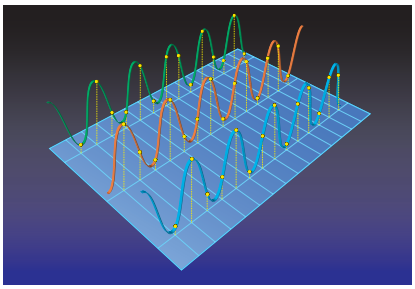
RED-tech II EDM uses phase comparison technology, which provides notable advantages in accuracy compared with EDMs using pulse measurement methods. Combined with Sokkia's leading edge digital signal processing technology and refined optics, superbly accurate reflectorless measurement is now a reality.

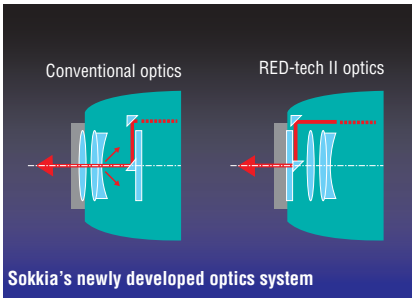
● Digital signal processing

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

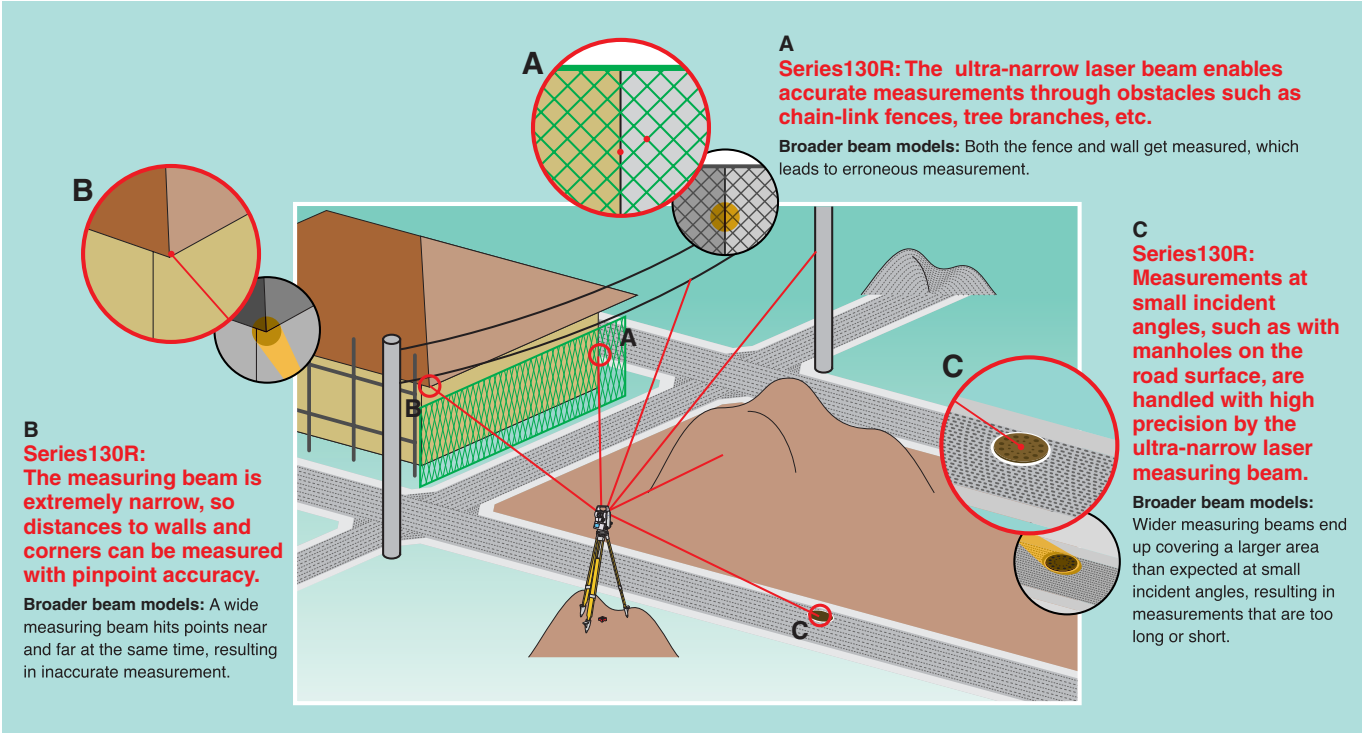
Sokkia has further refined its traditional optics system, which emits measuring light from the objective lens center and receives the returning light along its periphery.
With enhanced optics that provide the ideal light path, RED-tech II EDM dramatically increases reliability by emitting the laser beam 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, RED-tech II EDM emits an ultra-narrow visible laser beam 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.





kes Reflectorless EDM More Powerful Than Ever

Ultra-narrow visible laser for pinpoint accuracy



The Series130R 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

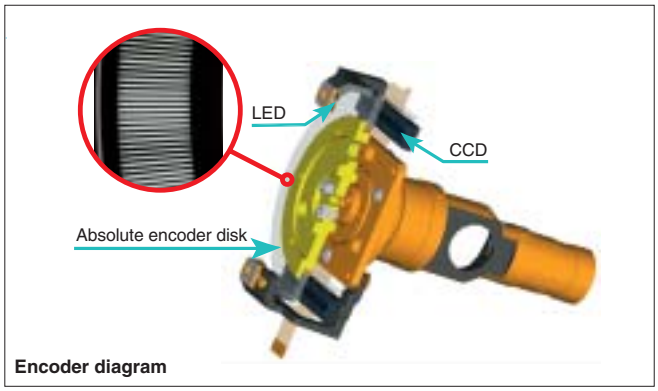
Measure long distances by directing the laser beam at a reflector. When using a single AP prism, you can measure as far as 5,000m (16,400ft.)* at once, with an accuracy of ±(2 + 2ppm x D)mm. In addition, reflective sheet targets may be used to get measurements of up to 500m (1,640ft.)** with ±(3 + 2ppm 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 Series130R 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.

Enhanced Hardware Relia

Sokkia's original absolute encoders



Encoder diagram

The Series130R total stations are equipped with Sokkia-developed absolute encoders. These encoders feature the RAB (RAndom Bi-directional) code technology first used in the SDL30 digital level, which provides high stability and reliability. You do not need to reset for 0 indexing at the start of a job, so surveying can begin from the moment you turn on the power. Work efficiency is also boosted by the immediate display of azimuth whenever you restart the total station.

Triple-axis compensation for high reliability

Vertical and horizontal angles are compensated for by a dual-axis compensator that detects the tilt of the total station in two directions. In addition, a collimation function corrects the deviation of the telescope's mechanical axis. Working together, these features offer maximum reliability with angle measurements.

Password function for security

The Series130R provides a password-protection function for security purposes. You can assign your own password to the instrument to prevent unauthorized use.

Large internal memory

The large internal memory can store approx. 10,000 data points. Its multiple job file structure allows you to have 10 job files.

CompactFlash card unit (factory option)

A card drive for commercially available CF memory cards (Type I) can be added as an optional feature. With this card drive, your memory capacity becomes virtually unlimited. Approx. 576,000 data points can be stored on an 64MB card. Cards up to 512MB are supported.

Data and status checks at a glance

Each Series130R total station has a built-in control panel on both sides of its body. These control panels have a clearly visible LCD screen that lets you quickly check EDM mode (reflectorless, prism, or reflective sheet target), laser beam mode, guide light function, and more.

Easy target selection

Selecting a target is amazingly simple. You can switch between reflectorless, prism, and reflective sheet target modes just by pressing the SFT key in sequence, and the icon of the selected target is displayed on the LCD screen for easy confirmation.

Easy operation with alphanumeric keys, softkeys, and new direct keys

Alphanumeric keys (10 keys) are laid out for easy entry of point names, coordinate values, and other information. Softkey functions are freely assigned by users for their convenience. New direct keys allow on-the-fly access to "configuration", "electronic level" and "EDM returned signal check" screens.

Superior environmental protection

Featuring advanced protection against dust and water, the Series130R total stations are able to withstand harsh environmental conditions (IP64 compliant).

The International Electrotechnical Commission standard IEC 60529 describes a system for classifying degrees of protection provided by enclosures of electrical equipment.
The IP Code consists of the letters IP and two numerals. Larger numbers represent greater levels of protection.

Protection against ingress of **solid foreign objects**
Highest level: 6
7 levels: 0 to 6.
X: unspecified.

IP 64

Protection against ingress of **water**
Highest level: 8
9 levels: 0 to 8.
X: unspecified.

bility and Increased Productivity

SF14 wireless keyboard (option)

The SF14 wireless keyboard has a total of 37 keys (including alphanumeric keys, softkeys, and measurement controls), to enable quick and easy data entry of point names and coordinate values. Because all key operations can be performed with this wireless keyboard, you won't need to touch the total station after it's been aimed at the target. Protection against dust and water is another advantage, as you can use the keyboard without worry in the rain or at a dusty construction site (IP44 compliant). The SF14 wireless keyboard can also be used with Series030R, Series30R, and Series10 total stations.

Sensors for the wireless keyboard

Extremely compact sensors are mounted on both sides of Series130R total stations for communication with the optional SF14 wireless keyboard. These sensors are extremely resistant to light interference, and have a wide signal reception range to allow comfortable use of the keyboard.

Two battery types: Ni-MH and Ni-Cd

The BDC35A Ni-MH battery* gives you 7 hours of continuous angle and distance measurement. The optional Ni-Cd battery (BDC40A) offers longer operation in low temperatures.

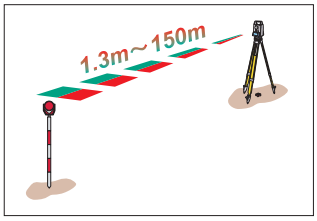
* Standard equipment.

Optional accessories

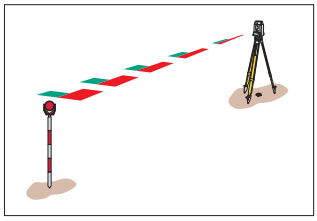
SF14 wireless keyboard • Guide Light Unit GDL2 (factory option) • CF card unit (factory option) • CDC41 car cigar sockets charger • BDC40A Ni-Cd battery • BDC57 Ni-MH external battery, EDC3A power cable for BDC57 (2m), EDC7A power cable for BDC57(0.5m), CDC14 battery charger for BDC57 • EDC2A AC adaptor (100 to 240V) • EDC14 external battery adapter, EDC5 car battery cable for EDC14, EDC4 car cigarette lighter cable for EDC14 • OF3A solar filter • DE25 diagonal eyepiece • EL7 40x eyepiece • DOC46 printer cable • DOC25 (25 pins, male), DOC26 (25 pins, female), DOC27 (9 pins, female), DOC1 (w/o connector) interface cables • ACE5 auto-collimation eyepiece

Guide Light Unit GDL2 (factory option)

The Guide Light Unit GDL2 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. And when you see green and red flashing back and forth simultaneously, that means you are on the telescope sighting direction. The GDL2 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.

Guide Light Unit GDL2	Green LED (524nm) and Red LED (630nm) (IEC Class 1 LED)
Visible range	1.3m to 150m (4.3ft. to 490ft.)
Visible width	Horizontal & vertical: more than ±4°; approx. 7m at 100m (23ft. at 320ft.)
Center resolution	Within 4'; approx. 12cm at 100m (4.7in. at 320ft.)

The Guide Light Unit cannot be used simultaneously with the laser pointer function.

Reflectorless | Laser Pointer | Sheet Target | Prism | Class 3R* Laser | Class 2*1 Laser | Absolute | Compensator | Repetition | % | LCD Level

Guide Light*1 | Ex-Keyboard*2 | 10,000points | Memory Card*1 | RS-232C | Printer-Out | Ni-MH | Ni-Cd*2 | IP 64

*1 Factory option *2 Option

Versatile Functions for Hig

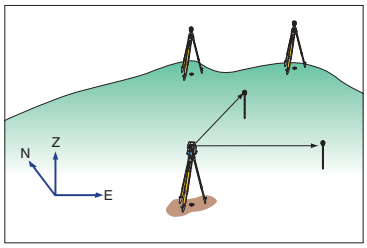
Missing Line Measurement (MLM)

At the touch of a key, the Series130R measures horizontal distance, slope distance, height difference and percentage of slope between two points.

Remote Elevation Measurement (REM)

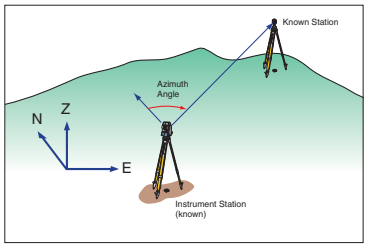
The Series130R easily determines the height of a point where distance cannot be measured directly. Sight a point either directly above or directly below the target point, and then sight the target point.

3-D Coordinate Measurement



The Series130R calculates 3-D coordinate values of measuring points and displays them either as N, E, Z or E, N, Z.

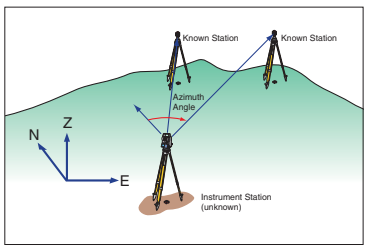
Automatic Azimuth Angle Setting



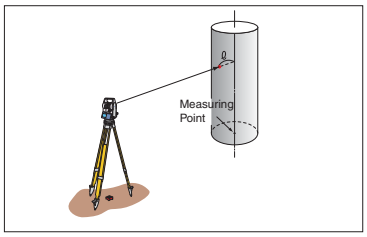
The Series130R can automatically set the horizontal angle to the azimuth of a back sight by using the coordinates of the instrument station and the back sight point.

Resection

The Series130R can determine the azimuth and coordinates of an unknown instrument station with 2 to 10 known points. When using two points, measure both angles and distances. When using three or more points, the distance is not required. Station elevation from known reference points (up to 10 points) can also be calculated and each deviation of multiple reference points is displayed. If a bad point is selected it can be recalculated, re-observed or replaced with a new point.



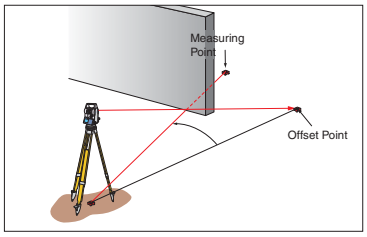
Offset/Distance



The Series130R calculates the angles and distance, or the coordinates of the measuring point by inputting the distance and direction between the measuring point and the offset point.

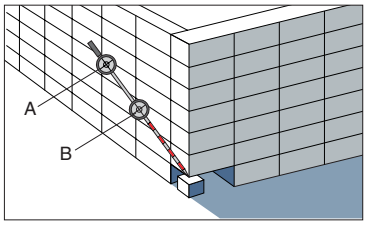
Offset/Angle

The Series130R automatically calculates the position of measuring points. First, measure a point on either side of the measuring point at the same distance from the Series130R instrument. Then sight the measuring point.



Two-Distance Offset

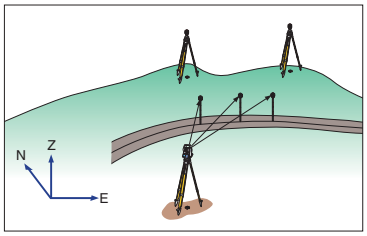
With the use of a 2RT500-K 2-point target, the Series130R can measure hidden points easily and efficiently. Set the two-point target on the measuring point (the target does not have to be perpendicular), measure targets A and B, and input the length between target B and the measuring point. The Series130R calculates the position of the measuring point in angles and distance, or in coordinate values.



Traverse Adjustment

The Traverse Adjustment program allows you to specify a sequence of stations through which a traverse may be calculated and optionally adjusted. The observations do not have to be made in the same order as the traverse route.

Setting Out



The Series130R performs three-dimensional setting out with N, E and Z or E, N and Z coordinates. Directions and distances to the setting out position are indicated on the screen.

h Work Efficiency at Diverse Sites

Set-out Line

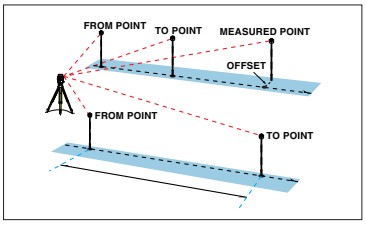
The Set-out line program is used for setting out and checking alignment of curb lines, construction boards and grades of pipes. A baseline or an offset from baseline can be defined.
When calculating the measuring point, it's possible to calculate and use the scaled down coefficient of the distance and surveyed value that was calculated using the known coordinate values of 2 points.

Set Out Arc

The Set Out Arc program provides a generalized arc calculator to allow the definition of curves from almost any combination of parameters. Points along the arc can be coordinated and directly set out.

Point Projection

This program projects a point onto a line. It calculates the distance and offset of the point relative to the specified baseline, and it computes the coordinates of the intersection point, which can then be directly set out. Elevations are interpolated where possible.
When calculating the measuring point, it's possible to calculate and use the scaled down coefficient of the distance and surveyed value that was calculated using the known coordinate values of 2 points.

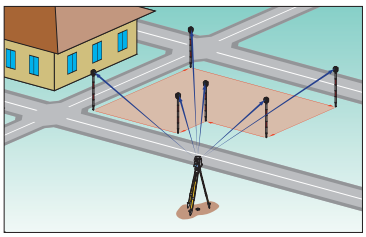


Set-out Line and Point Projection

Intersections

It is possible to find an intersection point between 2 reference points by specifying the length and/or azimuth angle of either point.

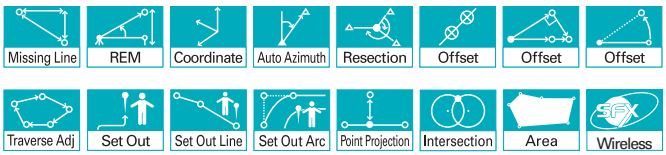
Area Calculation



The Series130R can use measured points or stored data–up to 50 points in total–to calculate an area. Area calculations are made with 3D coordinates, so even sloped surfaces can be measured with ease and precision.

The ideal partner for data collectors

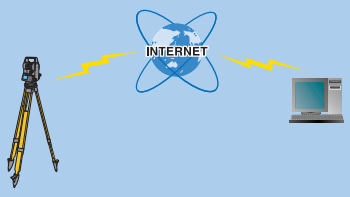
The Series130R's two-way communication capability brings out the full functionality of external data collectors. All operations, except for sighting, can be performed with a data collector, so there is no need to touch the instrument itself. The Series130R optionally incorporates *Bluetooth*® wireless technology to enable wireless communication with data collectors. Please consult your local Sokkia representative for availability. This is a factory option.



Sokkia Field-info Xpress

Instantaneous data transfer between any worksite and your office.

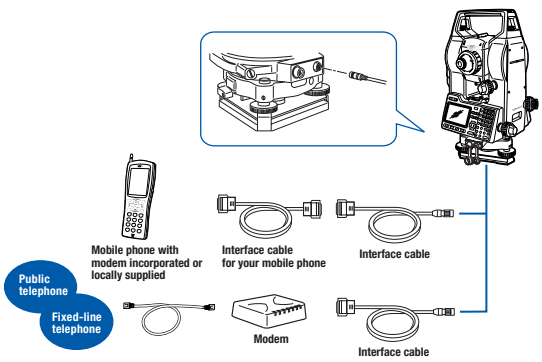
The Series130R can send surveyed data to a specified e-mail address or FTP server. It can also receive coordinate data for setting-out from your office computer or FTP server.



Just connect a mobile phone (and modem, if necessary) to the Series130R using the appropriate cables, establish an Internet connection, and select the job files. Multiple job files can be sent out simultaneously. Data should be in the SDR33 or SDR2x format. All SFX functions can be performed via the Series130R's operation panel.

Password protection is available to prevent unauthorized use.

System Diagram



SFX requires connectivity using a mobile phone with a service provider capable of e-mail data transfer to an external source, as well as an active e-mail account and FTP server. Consult your local telecoms operator for proper equipment and connectivity requirements.

Series 130R Reflectorless Total Stations

SET1130R3 · SET2130R3 · SET3130R3 · SET4130R3 · SET1130R · SET2130R · SET3130R · SET4130R

SPECIFICATIONS

Model		SET1130R3	SET2130R3	SET3130R3	SET4130R3	SET1130R	SET2130R	SET3130R	SET4130R
Availability		Standard models				Factory options			
Laser class*1		Class 3R Laser Product				Class 2 Laser Product			
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		Photoelectrical absolute encoder scanning. Both circles adopt diametrical detection.							
Unit		Degree / Gon / Mil, selectable							
Display resolutions (selectable)		0.5" / 1", 0.1 / 0.2mg, 0.002 / 0.005mil		1" / 5", 0.2 / 1mg, 0.005 / 0.02mil		0.5" / 1", 0.1 / 0.2mg, 0.002 / 0.005mil		1" / 5", 0.2 / 1mg, 0.005 / 0.02mil	
Accuracy (ISO17123-3:2001)		1" / 0.3mg / 0.005mil	2" / 0.6mg / 0.01mil	3" / 1mg / 0.015mil	5" / 1.5mg / 0.025mil	1" / 0.3mg / 0.005mil	2" / 0.6mg / 0.01mil	3" / 1mg / 0.015mil	5" / 1.5mg / 0.025mil
Measuring time		0.5s or less, continuous							
Measurement mode		H: Clockwise / Counterclockwise, selectable. 0 set, Hold, Angle input, repetition, available. V: Zenith 0 / Horizontal 0 / Horizontal 0± / Slope in %, selectable							
Automatic dual-axis compensator		Dual-axis liquid tilt sensor, Working range: ± 3' (± 55mg)							
Collimation compensation		On / Off, selectable							
Fine motion screws		Fine / Coarse 2-speed motion							
Distance measurement		Modulated laser, phase comparison method with red laser diode, coaxial optics							
Laser output		Reflectorless mode: Class 3R (max. 5mW) Prism/Sheet mode: Class 1 equivalent (max. 0.22mW)				Reflectorless mode: Class 2 (max. 0.99mW) Prism/Sheet mode: Class 1 equivalent (max. 0.22mW)			
Unit		Meters / feet / inches, selectable							
Measuring range (slope distance)	Reflectorless*2 (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)				0.3 to 200m (1 to 650ft.) (White side, 90% reflective) 0.3 to 80m (1 to 260ft.) (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	Under average conditions*4: 1.3 to 4,000m (13,120ft.), Under good conditions*5: 1.3 to 5,000m (16,400ft.)							
	With 3 AP prisms	Under average conditions*4: to 5,000m (16,400ft.), Under good conditions*5: to 6,000m (19,680ft.)							
Display resolutions	Fine mode	0.0001/0.001m, 0.001/0.01ft., 1/16 or 1/8in.		0.001m, 0.01ft., 1/8in.		0.0001/0.001m, 0.001/0.01ft., 1/16 or 1/8in.		0.001m, 0.01ft., 1/8in.	
	Rapid single / Tracking	Rapid single: 0.001m, 0.01ft., 1/8in. / Tracking: 0.01m, 0.1ft., 1/2in.							
Accuracy (D=measuring distance, unit:mm)	Reflectorless*2/*3 (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				0.3 to 100m (1 to 320ft.): ± (3 + 2ppm x D)mm Over 100 to 200m (over 320 to 650ft.): ± (5 + 10ppm x D)mm			
	Reflectorless*2/*3 (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				0.3 to 100m (1 to 320ft.): ± (6 + 2ppm x D)mm Over 100 to 200m (over 320 to 650ft.): ± (8 + 10ppm x D)mm			
	With reflective sheet target	Fine: ± (3 + 2ppm x D)mm, Rapid single: ± (6 + 2ppm x D)mm							
	With AP prism	Fine: ± (2 + 2ppm x D)mm, Rapid single: ± (5 + 2ppm x D)mm							
Measuring time	Fine mode	Repeat: every 0.9s (initial 1.7s), Single: 1.7s							
	Rapid single / Tracking	Rapid single: 1.8s / Tracking: Every 0.3s (initial 1.6s)							
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		Yes (K=0.142 / 0.20) / No, selectable							
Scale factor setting / Sea level correction		0.5 to 2.0 / Yes / No							
Data storage and transfer									
Data storage	Internal memory	Approx. 10,000 points with max. 10 job files							
	Memory card unit	CF card unit is available as a factory option.							
Interface		Asynchronous serial RS-232C compatible, Baud rate: 1,200 to 38,400bps / *Bluetooth* wireless communication is available as a factory option.							
SFX wireless data transfer		Provided							
Printer output		Centronics compatible (with optional DOC46 printer cable)							
General									
Display		Alphanumeric/graphic dot matrix LCD, 192 x 80 dots, with backlight, with contrast adjustment, on both faces							
Keyboard		4 softkeys, 3 direct keys, alphanumeric keys, total 31 keys on both faces							
SF14 wireless keyboard		Optional							
Laser-pointer function		ON (auto off in 5 minutes) / OFF, selectable. (Does not work simultaneously with the Guide Light.)							
Laser radiation indicator		Yes				None			
Guide Light Unit GDL2		Factory option							
Sensitivity of levels	Plate level	20" / 2mm	30" / 2mm*6	30" / 2mm		20" / 2mm	30" / 2mm*6	30" / 2mm	
	Circular / Graphic	Circular level: 10' /2mm / Graphic LCD level: 3' / outer circle							
Optical plummet	Magnification	5.5x	3x			5.5x	3x		
Tribrach		Detachable							
Dust and water protection / Operating temperature		Conforms to IP64 (IEC 60529:1989) / -20 to +50°C (-4 to +122°F)							
Instrument height / Size with handle and battery		236mm (9.3in.) from tribrach bottom / W 175 x D 171 x H 345 mm (W 6.9 x D 6.7 x H 13.6 in.)							
Weight with handle and battery		Approx. 5.8kg (12.7lb.)							
Power supply		6V DC							
BDC35A detachable battery		Ni-MH rechargeable battery, 2 BDC35A are included as standard accessories.							
	Continuous use per battery at 25°C (77°F)	About 7 hours (about 800 points) (single measurement every 30 seconds) About 9 hours (angle measurement only)							
	Recharging time	About 70 minutes per battery							
BDC57 external Ni-MH battery (optional)									
	Continuous use at 25°C (77°F)	About 29 hours (single measurement every 30 seconds), about 40.5 hours (angle measurement only)				About 30 hours (single measurement every 30 seconds), about 42 hours (angle measurement only)			
Automatic power cut-off / Resume function		Auto-off time is selectable from 30, 15, 10, 5 minutes or none. / Yes							

*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 Reflectorless range/accuracy may vary according to measuring objects, observation situations and environmental conditions.
*3 With Kodak Gray Card White Side (90% reflective)
*4 Average conditions: Slight haze, visibility about 20km (12 miles), sunny periods, weak scintillation.
*5 Good conditions: No haze, visibility about 40km (25 miles), overcast, no scintillation.
*6 20"/2 mm plate level is available as a factory option.

LASER RADIATION
AVOID DIRECT EYE EXPOSURE
MAX 5mW LD 635-690nm
CLASS3R LASER PRODUCT
IEC 60825-1 Am.2 2001

LASER RADIATION
DO NOT STARE INTO BEAM
MAX 0.99mW LD 635-690nm
CLASS2 LASER PRODUCT
IEC 60825-1 Am.2 2001

■ Standard accessoriess

BDC35A rechargeable Ni-MH batteries (2 pcs.) • CDC39/40/48 quick charger • CP7 tubular compass • Lens hood • Lens cap • Plumb bob • Tool kit • Wiping cloth • Vinyl cover • Operator's manual • Carrying case • Shoulder strap • Laser caution sign (for Class 3R models only)

Sokkia is a sponsor of the International Federation of Surveyors

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