SURVEYING INSTRUMENTS

# SOKKIN

## Series 130R Reflectorless Total Stations

Superior Range, Speed & Accuracy EXPAND YOUR REACH WITH A 350M • 1,140FT. REFLECTORLESS RANGE



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



## **Innovative Technology Ma**

### New advances with RED-tech EDM

Sokkia's revolutionary digital signal processing technology, RED-tech, relies on a unique procedure for measurement beam analysis. Using an A/D converter, it simultaneously samples measuring signals in three different frequencies. Furthermore, RED-tech uses advanced software to calculate distances. As a result, RED-tech ensures that the calculation method most suited to the condition of the measuring beam is selected. It also is able to deliver greater accuracy, speed, and range.



And now, RED-tech has been further enhanced through the inclusion of improved optical and electronic components. Its new light emitting and receiving optics provide the ideal light path for capturing light with minimal loss. And its new highly tunable optical filter, which captures multiple samples of beams carrying the correct measurement information, gives you greater precision with difficult-to-measure objects. Thanks to these new components and its advanced technology, RED-tech EDM paves the way to unprecedented distance measurement possibilities.



### Ultra-wide reflectorless measurement range

From extra-long distances to remarkably short ones, the Series130R offers accurate reflectorless measurement over a tremendous range of distances. The Series130R total stations feature a Class 3R laser, and cover a range from 0.3m to 350m (1ft. to 1,140ft.). Models equipped with a Class 2 laser are also available as a factory option. These have a reach of up to 150m (490ft.).

Distances based on use of the white side of a KODAK Gray Card.

### Reflectorless measurement range and accuracy with a Kodak Gray Card

SET1130R3 • SET2130R3 • SET3130R3 • SET4130R3 (standard models) Class 3R laser products



#### SET1130R • SET2130R • SET3130R • SET4130R (factory options) Class 2 laser products



## Sokkia's traditional optics

Sokkia's traditional optics have never been more refined. Light is projected from the middle of an objective lens and received along its periphery. When combined with a narrow measuring beam, this design enables pinpoint measurement and is highly effective even with narrow objects. Furthermore, the new telescope provides an extremely bright and sharp sight.



## kes Reflectorless EDM More Powerful Than Ever



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 conveniently be 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  $\pm(2 + 2ppm \times D)mm$ . In addition, reflective sheet targets may be used to get measurements of up to 500m (1,640ft.)\*\* with  $\pm(3 + 2ppm \times D)mm$  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



The Series130R total stations are equipped with Sokkia-developed absolute encoders. These encoders feature the RAB (RAndom Bidirectional) 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. 72,000 data points can be stored on an 8MB card. Cards up to 128MB 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).

## **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 44 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.

Extremely compact sensors are mounted on

extremely resistant to light interference, and have a wide signal reception range to allow

both sides of Series130R total stations for

communication with the optional SF14

wireless keyboard. These sensors are

comfortable use of the keyboard.

## 0000 00 0 000 00 OB 00 08

### 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) 1.3m to 150m (4.3ft. to 490ft.)

Visible range Horizontal & vertical: more than ±4°; approx. 7m at 100m (23ft. at 320ft.) Visible width 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

## Two battery types: Ni-MH and Ni-Cd

Sensors for the wireless keyboard

The BDC35A Ni-MH battery\* gives you 6.5 hours of continuous angle and distance measurement. The optional Ni-Cd battery (BDC40A) offers longer operation in low temperatures.

\* Standard equipment.



## 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.

#### 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

#### Area Calculation



The Series130R can use measured points or stored data to calculate an area.

Missing Line	REM	Coordinate	Auto Azimuth	A-QA Resection	Ø Offset	Offset
Offset	Set Out	Set Out Line	Point Projection	Area		



#### 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.

#### **Standard accessories**

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)

#### **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 • BDC12 Ni-Cd large external battery, EDC3 power cable for BDC12 (2m), EDC7 power cable for BDC12 (0.5m), CDC14 battery charger for BDC12 • 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



## **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.

#### 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.

## Series 130R

**Reflectorless Total Stations** 

## **SPECIFICATIONS**

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

Model		CET1/00D0	OFT0 ( as Do	CET2 come	CET/ come	CET1/00D	OFT0.000	CET2	CET4		
Availability		Standard models	SE12130R3	5EI 3130R3	5E14130R3	SEI 1130R	5E12130R	SE13130R	SE14130R		
Availability		Class 2P Lasor Produc	*			Class 2 Lasor Produ	ot				
Laser class		Fully transiting popyin	L cighting and dictant	o macuring option		GIASS 2 LASEL FIGUU	υι				
Telescope		Fully transitility, coaxia	) Objective exerture	Le medsuring optics	40mm (1 0in )) Magn	ification, 20v. Deceluir	a nouver 0 5° Image	Front Field of view 1°9	0' (06m/1.000m)		
		Lengun, rrinnin (o.m.), oujective aperture: aprint (r.sin.) (cum 4omini (r.sin.)), magnimication: 30x, Hesoiving power: 2.5°, image: Erect, Heid of view: 1 30° (26m/1,000m),									
Anala management		Iminimum rocus: 1.3m (4.3r.), keticle glass: co mark printed, keticle illumination: 5 brightness levels									
Angle measurement		r nouelectrical absolute encoder scanning. Both circles adopt diametrical detection.									
Unit Discharge	1										
Display resolutions (se	rectable)	0.5 / 1 , 0.1 / 0.2119, 0	J.UU2 / U.UU3IIIII	1 / 5 , 0.2 / 11119, 0.0	00 / 0.0211111 5" / 1.5mg / 0.005mi	0.5 / 1 , 0.1 / 0.211g	, 0.002 / 0.00011111 il _ 0" / 0.6mg / 0.01mi	1 / 5 , 0.2 / 1119, 0.0	00 / 0.021111		
Accuracy (ISU/DIN128	57-2:1997)	1 / 0.amg / 0.00mm 2 / 0.0mg / 0.0mm 13 / 1mg / 0.0mm 13 / 1mg / 0.02mm 12 / 0.amg / 0.00mm 12 / 0.0mg / 0.01mm 13 / 1mg / 0.01mm 15 / 1.mg / 0.02mm 15 / 1.mmg / 0.02									
Neasuring time		U.35 UI IESS, UIIIIIUUUS Districts ( Operated statistics and statistics and statistics and statistics and statistics)									
weasurement mode	H	Jordemite / Outrison outermise, setectable, U set, http://doi.org/10.1007/1007/									
Automatic dual auto as	V	Letiniti V Tranzona V Tranzali U 27 Jupe III //o, Seteculare Diala azie limit di lisance na vi Arizia razie da li Sena									
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Commation compensation		Int / on, solocatio									
Distance measurement	•	Minutated learn base commarism method with red lacer diade coavial online									
Laser output		Balanchices made Class Staniulation manual (max SMM) Balanchices made Class Staniulation (max 0.00mM)									
Laser output		Temetodinas mode. Class on equivalent (na.k. onny) Priem/Shaat mode. Class 2 equivalent (na.k. 0.3311W) Priem/Shaat mode. Class 1 aniukalent (max n 0.29mW) Priem/Shaat mode. Class 1 aniukalent (max n 0.29mW)									
Unit		ribinoneerindee daas reguraani (nas. 0.22mm) (nas. 0.22mm) (nas. 0.22mm) (nas. 0.22mm)									
Measuring range	Paflactoriace*2	10.3 to 350m /1 to 1.40ff to White side .90%, reflective)									
(slone distance)	(using Kodak Gray Card)	0.3 to 170m (1 to 550t	ft ) (Grav side 18% r	eflective)		0.3 to 80m (1 to 260ft ) (Grav side 18% reflective)					
(slope distance)	With reflective cheet target	Resonance 1 a to 500m (1 Addith) RS50N.K* 1 a to 300m (480ff) RS10N-K* 1 a to 100m (320ff)						511001170)			
	With mini nrieme										
	With 1 AP prism	Under average conditions*4:13 to 4 000m (13;700t.)									
	With 3 AP prisms	Under average condition	ons*4: to 5 000m (16	400ft ) Under good c	nditions*5: to 6 000n	n (19 680ft )					
Display resolutions	Fine mode	0.0001/0.001m 0.001	/0.01ft	0.001m 0.01ft 1/8i	1	0.0001/0.001m 0.0	01/0 01ft	0.001m 0.01ft 1/8in	1		
Display resolutions		1/16 or 1/8in	, <b>0.0</b> ma,	0.00111, 0.0112, 1/01		1/16 or 1/8in	01/0.011L.,	0.00111, 0.0112, 1/01	•		
	Banid single / Tracking	Banid single: 0.001m	0.01ft 1/8in / Track	(ing: 0.01m 0.1ft 1/2i	n	1/10 01 1/011.					
Δοομιταον	Accuracy Deflectorlass*2/*3		(1.01112, 1.00112, 1.00112, 1.00112)	imm		0.3 to 100m (1 to 32	20ft ): + (3 + 2nnm x D	)mm			
(D-measuring	(Fine mode)	Over 200 to 350m (over	$O_{\text{star}}(x) = O_{\text{star}}(x) + O_{\text$								
distance unit:mm)	Reflectorless*2/*3	0.3 to 200m (1 to 650t	$f(x) = (6 + 2nnm \times D)$	Imm		0.3 to 100m (1 to 320ft.); + (6 + 200m x D)mm					
ulotanoo, unit.ininj	(Banid single mode)	Over 200 to 350m (over 650 to 1 1/0ff) : + (8 + 100nm x D)mm					over 320 to 490ft ): + (	78 + 10nnm x D)mm			
	With reflective sheet target	Fine: $+ (3 + 200 \text{ x D})$	Stor 20 to 300m (visi 00 to 1, iter.): (0 + ioppin x b)mm [iter 100 to 100m (visi 020 to 40m.): (0 + ioppin x b)mm]								
	With AP nrism	Fine + () + 2pm x Dimin, hepto binger () + 2pm x Dimm									
Measuring time	Fine mode	Beneat: every 13s (initial 26s) Sinole 2 6s									
Banid 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	n / Prism constant correction	Temperature / Pressure / ppm input, available. / -99 to +99mm (1mm steps). 0 fixed in reflectorless mode.									
Refraction & earth-cur	vature correction	ON (K=0.142 / 0.20) /	OFF, selectable	1	• /						
Data storage and trans	fer										
Data storage	Internal memory	Approx. 10,000 points with max. 10 job files									
0	Memory card unit	SCRC3 CF card unit is available as a factory option.									
Scale factor setting	•	0.5 to 2.0									
Interface		Asynchronous serial RS-232C compatible, Baud rate: 1,200 to 38,400bps									
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		20" / 2mm		30" / 2mm			
	Circular / Graphic	Circular level: 10' /2mr	m / Graphic LCD lev	vel: 3' / outer circle							
Optical plummet	Magnification	5.5x	3x			5.5x	3x				
Tribrach		Uetachapie									
Dust and water protection / Operating temperature											
Instrument height / Size with handle and battery		230mlnl (3.5ml.) fuon i indiach boltom / w 1/5 x D 1/1 x H 345 mlm (W 6.9 x D 6./ x H 13.6 ml.)									
Weight with handle and battery		http://www.co.kg/(12.7/0.)									
Power supply											
BDC35A detachable battery		INFINIT Rectal yearder battery, Z. BULSSA are included as statudard accessories.									
Continuous use per battery at 25°C (77°F)		Auou o.o. nouis (auou / 20 points) (single measurement every 30 seconds)									
		Audur 3 nours (angus measurement only)									
Recharging time		NUUL / U IIIIIILES JPI LALIEN Continuum en at 05° (0777), Neut 05 haurs (right managumment aunu 10 annanda), ch ut 05 haurs (racta managument actu)									
Automatic power cut-off		Journados dos a 200 (171). Audul 20 nous comprenentente every do secondo), audul 30 nous (angre medadrement unity)									
Automatic power cut-o	11	Autoroni unite is Serectable notifi 30, 13, 10, 3 minutes of none.									
*1 IEC 60005 14md 0: 000	1 / EDA CDDU 01 CED Devit0.40.40	100 and 100111/Complian with EDA and propagatoria for long products assess for deviations pursuant to Long Nation Nation Nation (2001)									
1 IEU 00020-TAMO.2: 200	*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 \*3 With Kodak Gray Card White Side (90% reflective) \*4 Average conditions. Sligh haze, visibility about 20km (12 miles), sunny periods, weak scintillation.

\*5 Good conditions: No haze, visibility about 40km (25 miles), overcast, no scintillation.



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ISO9001 Certified (JQA-0557)

http://www.sokkia.co.jp/english/

INTERNATIONAL SALES DEPARTMENT 260-63 HASE, ATSUGI, KANAGAWA, 243-0036 JAPAN PHONE +81-46-248-7984 FAX +81-46-247-1731

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