SOKKIA

Series 10

SET210 · SET310 · SET510 · SET610

Total Stations

with enhanced EDM

Photo:
SET310 with optional memory card unit

FASTER, EASIER, WITH INCREASED FUNCTIONALITY – THE NEW GENERATION STANDARD TOTAL STATIONS.

Series10

SET210 · SET310 · SET510 · SET610

The Series10 total stations boast a superior environment-proof construction featuring IP66 (IEC) protection and smooth operation even in extremely cold climates*. Sokkia's field-proven EDM and original absolute encoders perform stable and reliable measurements, and a wide variety of surveying programs offer solutions for all your surveying tasks.

**** The SET510 Low Temperature Model provides smooth operation in temperatures as cold as -30°C (-22°F).***

Sokkia's original absolute encoder

The Series10 total stations are loaded with absolute encoders that employ the RAB code (RAndom Bi-directional code) which was originally developed for the digital level SDL30. Through the use of advanced signal processing, stable and reliable angle measurement data can be obtained. As there is no need to reset the total station for 0 indexing at the start of surveying, measurement can be started as soon as the power is turned on.

Highest Level of Robustness

IP 66

The Series10 complies with IEC (International Electrotechnical Commission) environmental standard IP66 (IEC 60529). The first digit following IP indicates the level of protection against the ingress of solid foreign objects, of which 6 is the highest grade—dust-tight, meaning no dust can enter the unit. The second digit indicates the level of protection against the ingress of water. Grade 6 indicates protection against powerful water jets from any direction.

-30°C/-22°F

Working in extreme cold is not a problem, either. With the Low Temperature Model (factory option) of the SET510, the operating temperature range of the Series10 is extended to -30°C (-22°F). This model features newly enhanced mechanical structures as well as the latest LCD and lubricant developments to ensure the same ultra-smooth operation in extremely cold climates as under high temperatures. To ensure trouble-free, long-term operation even in the severe cold, a new external battery system has also been developed. The new external battery BDC57 utilizes a state-of-the-art battery cell that was first developed for use in hybrid motor cars, and new power cables EDC3A and EDC7A are as flexible in sub-zero conditions as at normal room temperature.

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. 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)

* Available for SET210/310/510.

FOF sensors*

Sokkia's original and extremely compact FOF (Fiber made of Optical Filter material) sensors are mounted on two sides of the instrument for communication with the 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.

* Available for SET210/310/510.

Large internal memory

The Series10 can store approximately 10,000 data points, including known points and other information. To facilitate concurrent use at different work sites, data may be sorted into 10 different job files.

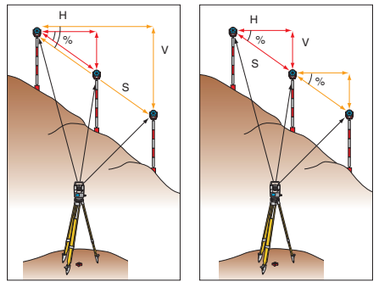
CompactFlash card unit (Factory option*)

A card unit for commercially available CompactFlash memory cards can be added as a factory option. 576,000 points (114 files, each holding 4,000 points) can be stored with an 64MB memory card. Cards up to 512MB are supported.

* Available for SET210/310/510.

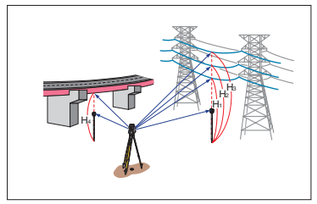
A wide variety of functions provide increased operation efficiency

Missing Line Measurement (MLM)



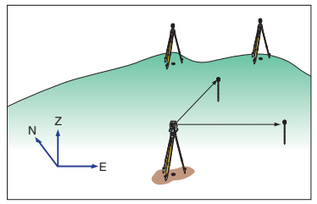
At the touch of a key, the Series10 measures horizontal distance, slope distance, height difference and percentage of slope between two prisms.

Remote Elevation Measurement (REM)



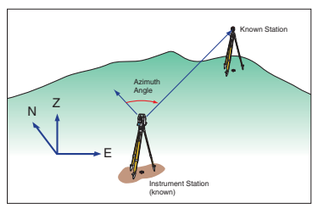
The Series10 easily determines the height of a point where a prism cannot be placed. Sight a prism either directly above or directly below the target point, and then sight the target point.

3-D Coordinate Measurement



The Series10 calculates 3-D coordinate values of measuring points and displays them either as N,E,Z or E,N,Z.

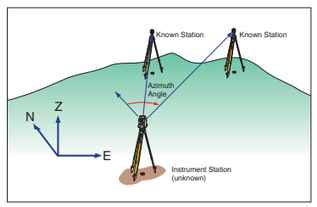
Automatic Azimuth Angle Setting



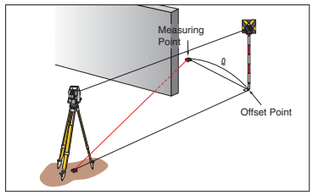
The Series10 can automatically set the horizontal angle to the azimuth of a back sight by using the coordinates of the instrument station and the back sight point.

Resection

The Series10 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.

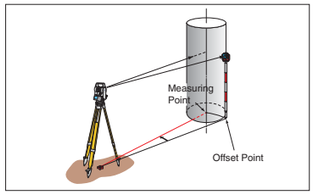


Offset/Distance



The Series10 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 prism.

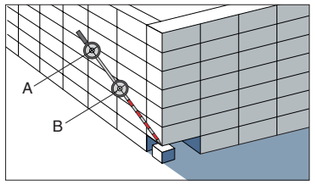
Offset/Angle



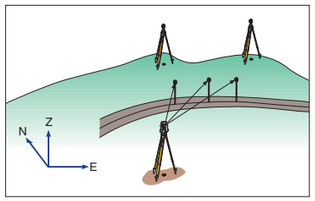
The Series10 automatically calculates the position of measuring points. First, set the prism on either side of the measuring point at the same distance from the Series10 instrument. Measure the prism, then sight the measuring point.

Two-Distance Offset

With the use of a 2RT500-K 2-point target, the Series10 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 Series10 calculates the position of the measuring point in angles and distance, or in coordinate values.



Setting Out



The Series10 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.

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.

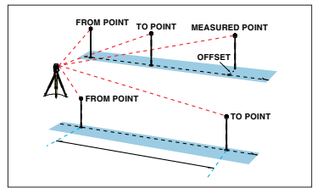
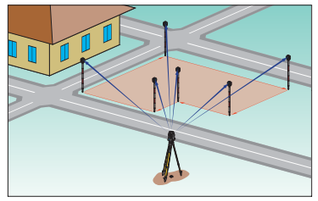


Illustration of Set-out Line and Point Projection.

Area Calculation



The Series10 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.

SDR Series Data Collectors (Optional)

Sokkia's extremely popular SDR series data collectors can be fully utilized through the 2-way communication capability of the Series10 instruments. Highly sophisticated programs such as Topography, Traverse Adjustment, Building Face Survey, various types of Setting Out measurement, Road measurement and more are available through combined use of the Series10 and SDR data collectors.

Standard Accessories

BDC46A rechargeable battery: 2 pcs. (SET610: 1 pc.) ● CDC68 quick charger with EDC113A/113B/113C power cable ● CP7 tubular compass ● Lens hood ● Lens cap ● Plumb bob ● Tool kit ● Operator's manual ● Carrying case and shoulder strap

Optional Accessories

SF14 wireless keyboard* ● CF card unit* (factory option) ● BDC57 external Ni-MH battery (low-temperature compatible)*, EDC3A power cable for BDC57 (2m, low-temperature compatible)*, EDC7A power cable for BDC57 (0.5m, low-temperature compatible)*, CDC14 battery charger for BDC57* ● EDC2A AC power adapter (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 eyepiece (40x) ● EL6 eyepiece for SET610 (30x) ● DOC46 printer cable ● DOC25 (25 pins, male), DOC26 (25 pins, female), DOC 27 (9 pins, female), DOC1 (w/o connector) interface cables ● LAP1 laser plummet ● ACE5 auto-collimation eyepiece ● SC189 back pack

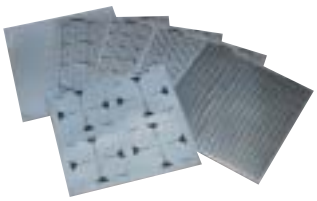
* SET210/310/510 only.

For more information, please consult your local sales representative.

Low Temperature Model (Factory option)

The SET510 Low Temperature Model is optionally available. It features Sokkia's new LCD and lubricant technology to ensure extremely smooth operation in climates as cold as -30˚C (-22˚F), without compromising performance in high temperatures.

Fast and reliable EDM



Series10 total stations measure the distance every 1.6 seconds through use of the fine-continuous measurement mode. With glass prisms, a high accuracy of ±(2 + 2 ppm x D) mm is achieved. With the rapid measurement mode, distance is measured every 0.8 seconds, and the tracking mode updates the distance data every 0.3 seconds.

Large variety of reflective sheet targets for more versatility in the field

Sokkia offers a large lineup of reflective sheet targets, including adhesive sheet type, rotating type with pin-poles, rotating type for tribrachs, 2-point targets for hidden points and reflective staves for cross-sectional surveying.

Triple-axis compensation for dependable angle measurement

The dual-axis compensator monitors instrument tilt in two directions and corrects both vertical and horizontal angle values. The collimation function corrects the deviations of the telescope's mechanical axis.

Easy-to-use keyboard

Enjoy an efficient workflow and greater productivity thanks to Series10's ergonomic keyboard. Customizable softkeys enable reconfiguration of desired functions to any key position.

Extra-wide screen

Never lose sight of your project. Series10's high-density screen (192 x 80 pixels) provides optimum data visibility in a variety of temperatures.

Compact Lithium Ion battery

Take 7.5 hours of continuous angle and distance measurements with Series10's rechargeable Lithium Ion battery. Unlike Ni-Cd cells, Series10's Li-Ion batteries can be fully recharged at anytime, without diminishing the batteries' energy capacity. BDC46A/BDC46 batteries are commonly used for Sokkia's digital levels, etc.

Enhanced security

A password-protection function is included for security purposes. You can assign your own password to the instrument to prevent unauthorized use.

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 66

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

Sheet Target | Prism | Absolute | Compensator | Repetition | % | LCD Level

*1 Ex-Keyboard | RS-232C | Printer-Out

*2 Memory Card | 10,000points

Battery Li-ion | IP 66 | *3 -30˚C/-22˚F

*1 SET210 • SET310 • SET510 (Optional)
*2 SET210 • SET310 • SET510 (Factory option)
*3 Low Temperature Model only

Series 10 SET210・SET310・SET510・SET610

Total Stations

SPECIFICATIONS

			SET210	SET310	SET510	SET610
Telescope			Fully transiting, coaxial sighting and distance measuring optics.			
Length			170mm (6.7in.)			
Objective aperture			45 mm (1.8 in.) [EDM: 48 mm (1.9 in.)]			
Magnification			30 x			26 x
Image			Erect			
Resolving power			3"			3.5"
Field of view			1°30' (26 m/1,000 m)			
Minimum focus			1.0m (3.3 ft.)			
Reticle illumination			Built-in. 5 brightness levels			
Angle measurement			Photoelectrical absolute rotary encoder scanning. Both circles adopt diametrical detection.			
Unit		H&V	Degree / Gon / Mil, selectable			
Display resolutions		H&V	1" / 5", 0.2mgon / 1mgon, 0.005 mil / 0.02 mil, selectable			
Accuracy (ISO17123-3:2001)		H&V	2" (0.6mgon) (0.01mil)	3" (1 mgon) (0.015mil)	5" (1.5 mgon) (0.02mil)	6" (1.9 mgon) (0.025mil)
Measuring time			Less than 0.5 sec., continuous			
Measurement mode		H	Clockwise / Counterclockwise, selectable ; 0 set, Hold, angle setting, repetition, available			
		V	Zenith 0°, Horizontal 0°, Horizontal 0° ±90°, slope in % , selectable			
Automatic dual-axis compensator			ON (V&H, V only) / OFF selectable			
		Type	Dual-axis liquid tilt sensor			
		Range	±3' (±55 mgon), " out-of-range " warning display provided			
		Display resolution	According to display resolution			
Collimation program			ON / OFF selectable			
Fine motion screws			Fine/Coarse two-speed motion	One-speed motion		
Distance measurement			Modulated near infrared light (IEC Class 1 LED)			
Measuring range (slope distance)			A: Average conditions: slight haze, visibility about 20 km (12 miles), sunny periods, weak scintillation. G: Good conditions: no haze, visibility about 40 km (25 miles), overcast, no scintillation.			
	With RS90N-K reflective sheet target	A	2m to 120m (390ft.)			
	With CP01 compact prism	A	1m to 800m (2,620ft.)			
	With one AP01 prism	A	1m to 2,400m (7,870ft.)			
		G	1m to 2,700m (8,850ft.)			
	With three AP01 prisms	A	1m to 3,100m (10.160ft.)			
		G	1m to 3,500m (11.480ft.)			
Accuracy	With prism	Fine meas.	± (2 + 2ppm x D) mm			
(D=measuring distance; unit: mm)		Rapid meas.	± (5 + 5ppm x D) mm			
	With reflective sheet target*1	Fine meas.	± (4 + 3ppm x D) mm			
		Rapid meas.	± (5 + 5ppm x D) mm			
Unit			Meters / Feet / Inch, selectable			
Display resolution		Fine meas.	0.001 m (0.01 ft. / 1/8 inch)			
		Rapid meas.	0.001 m (0.01 ft. / 1/8 inch)			
		Tracking meas.	0.01 m (0.1 ft. / 1/2 inch)			
Measuring time		Fine meas.	Every 1.6 sec. (initial meas. 2.8 sec.)			
		Rapid meas.	Every 0.8 sec. (initial meas. 2.3 sec.)			
		Tracking meas.	Every 0.3 sec. (initial meas. 1.8 sec.)			
Measurement mode			Fine meas. (single/repeat/average) / Rapid meas. (single/repeat) / Tracking, selectable			
Atmospheric correction			(1) Temperature / pressure input, (2) ppm input, (3) w/o compensation, selectable			
Prism constant correction			-99 mm to +99 mm (1 mm steps)			
Refraction & earth-curvature correction			ON (K=0.142 / K=0.20) / OFF, selectable			
Scale factor setting			0.5 to 2.0			
Data storage and transfer						
Data storage	Internal memory		About 10,000 points			
	CompactFlash card unit *2		Optional			n/a
Interface			Asynchronous serial, RS-232C compatible, baud rate : 1,200 to 38,400 bps			
Printer output			Centronics compatible (w/optional DOC46 printer cable)			
General						
Display			Alphanumeric/graphic dot matrix LCD (192 x 80 dots) w/backlight, on both faces			Alphanumeric/graphic dot matrix LCD (192 x 80 dots) w/backlight, on one face
Keyboard			4 softkeys and 11 keys on both faces			4 softkeys and 11 keys on one face
Wireless keyboard			Optional			n/a
Sensitivity of levels	Plate level		30" / 2 mm*5	30" / 2 mm		40" / 2 mm
	Circular level (in tribrach)		10' / 2 mm			
	Graphic LCD level		3' / outer circle			
Optical plummet			Image: Erect, Magnification: 3x, Minimum focus: 0.3 m (0.99 ft.)			
Water and dust resistance			Conformity to class IP66 (IEC60529)			
Operating temperature*3			-20° C to +50° C (-4° F to +122° F)			
Tilting / Trunnion axis height			236mm (9.3in.) from tribrach bottom, 193mm (7.6in.) from tribrach dish.			
Size with handle and battery			W 165 x D 170 x H 341 mm (W 6.5 x D 6.7 x H 13.5 in.)			
Weight with handle and battery			5.2 kg (11.4 lb.)			5.0 kg (11.1 lb.)
Power supply			Operating voltage : 6.7V ~ 8.0V DC			
BDC46A Li-Ion detachable battery			Angle & distance continuous use*4: About 7.5 hours (About 900 points), Angle measurement only: About 10 hours Recharging time with standard quick charger: Less than 2 hours			
BDC57 external Ni-MH battery (optional)			Angle & distance continuous use*4: About 34 hours, Angle measurement only: About 45 hours			n/a
Battery level display			4 steps with warning message.			
Automatic power cut-off			30 / 15 / 10 / 5 minutes after operation / OFF, selectable			
Resume function			ON / OFF selectable (backed up for about 1 week)			

*1 When the beam's incident angle is within ±30° up and down / right and left in relation to the surface of the target.
*2 Flash memory card not included.The 8MB CompactFlash memory card provides approximately 72,000 points of data storage.
*3 SET510 Low Temperature Model operates under -30°C to +50°C (-22°F to +122°F).
*4 Fine & single measurement with 30 sec. measurement intervals at 25°C (77°F).
*5 20"/ 2 mm plate level is available as a factory option.

Sokkia is a sponsor of the International Federation of Surveyors

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A-168-E-11-0512-CH-AB Printed in Japan on 100% recycled paper with ecologically safe soy ink.