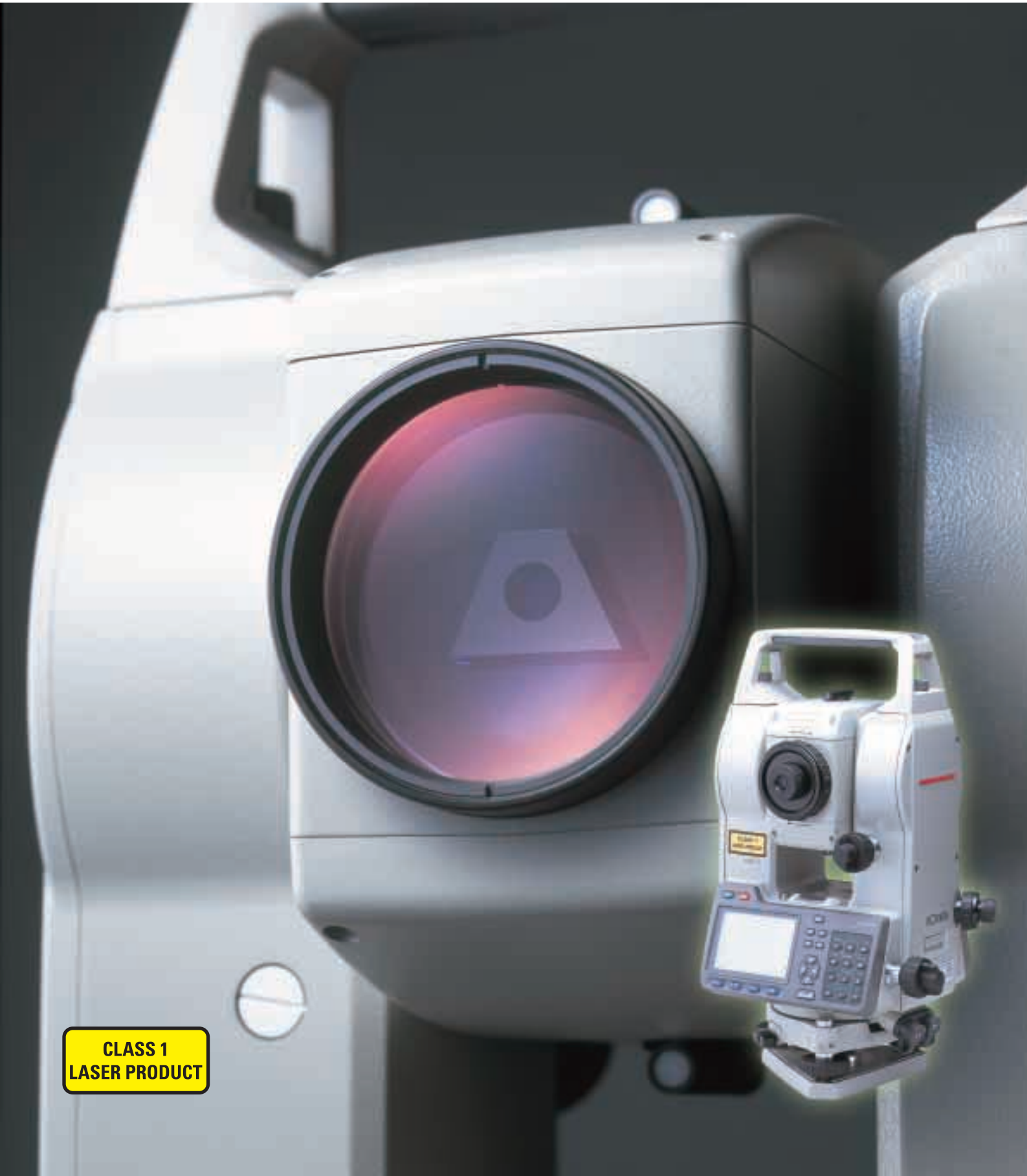
SOKKIA

NEW

SET3110R
SET4110R

SERIES 100R Non Prism Total Stations



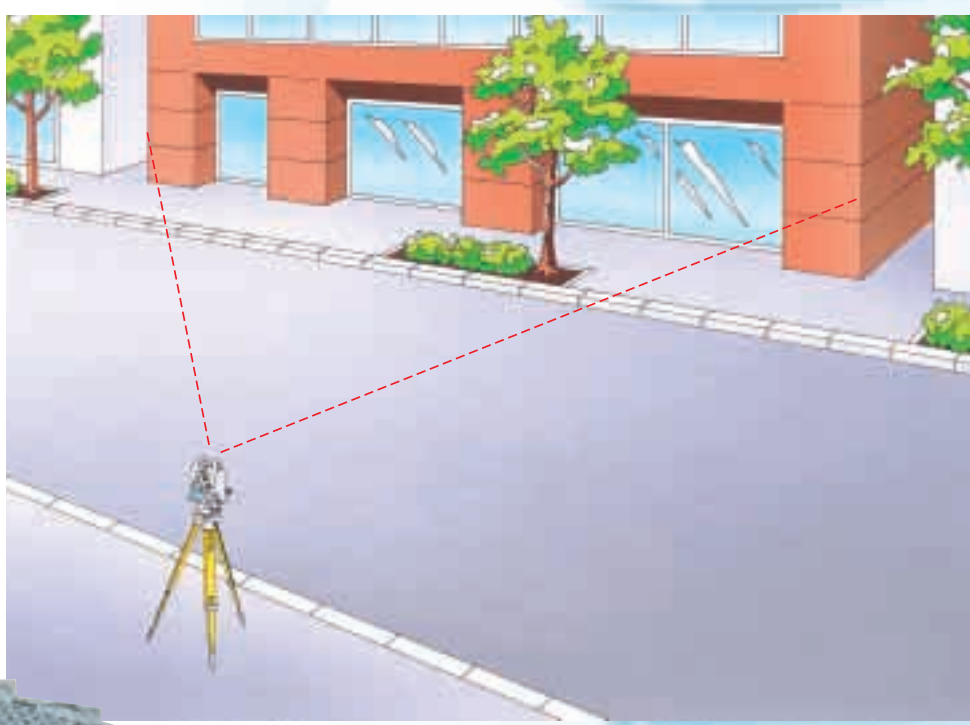
EXTENDING THE SURVEYING ENV
THE SET3110R/4110R NON PRISM TO

Sokkia's renowned high performance and full functionality have been combined with leading edge non prism technology to create the SET3110R/4110R total stations. Providing quick and accurate measurement directly without reflective targets, or with reflective sheet targets or conventional prisms puts unprecedented versatility in the hands of the modern surveyor.

Non Prism Measurement

Typically measuring up to 85 meters* to an accuracy of ±(5 + 3 ppm X D) mm makes this total station ideal for finding such things as the lengths of buildings using missing line measurement, or for measuring topography when some points are located in regions that would normally require access permission when using reflective targets.

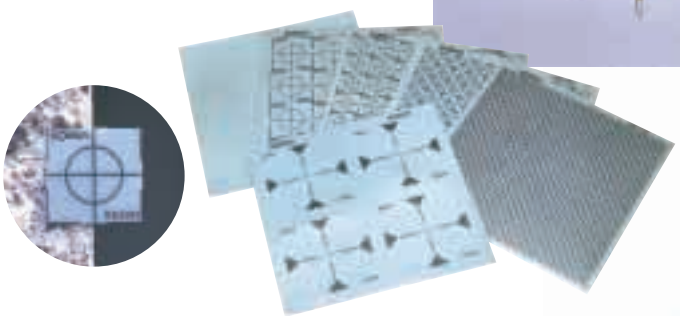
*Actual distances vary according to the reflectivity of the surfaces being measured to and the surrounding conditions.



Measurement with Reflective Sheet Targets

High precision over extended distances is achieved using Sokkia's practical and convenient reflective sheet targets. Accuracy of ±(3 + 3 ppm X D) mm at distances of up to 500 meters are typical with the RS90N (90 mm X 90 mm) reflective sheet target. Sokkia's popular range of reflective targets includes adhesive backed "stick-on" targets, reflective staffs and Sokkia's unique 2-point target to enhance performance and provide the versatility demanded by the modern surveyor.

A reflective target size of at least 30 mm X 30 mm is strongly recommended.



Unique Optical System

A modified version of Sokkia's unique electro-optical system has been employed in the SET3110R/4110R to provide precise measurement even to objects that are at an inclination to the line of sight.

Reliable Angle Measurement

Sokkia's time-tested, dual-axis tilt sensor assures accurate angle measurements. The dual-axis tilt sensor monitors deviations of both the X and Y axes, and corrections for horizontal and vertical angle readings are automatically computed and applied.
The collimation function automatically corrects the deviations of the horizontal, vertical and sighting axes.

Generous 3000-point Internal Memory

The internal memory provides storage for known point coordinate and measurement data (NEZ {ENZ} or SHV) and this data can be downloaded to a connected computer at a speed of 38 400 bps.

Large Display and 10-key Alphanumeric Keyboad

Easy-to-read large display and 10-key alphanumeric keyboard are provided on both faces for ease of use and the four function keys F1 through F4 can be customized to suit user needs.

Power for a Full Working Day

The SET3110R/4110R operates on a single rechargeable Nickel-Metal Hydride battery having a service life of 5.5 hours*. Two batteries are supplied as standard providing a full day's measuring work no matter how busy your schedule.

*Based on making fine measuring mode measurement once every thirty seconds.

VELOPE
OTAL STATIONS

SERIES 100R

SET3110R
SET4110R

Comprehensive Onboard Software

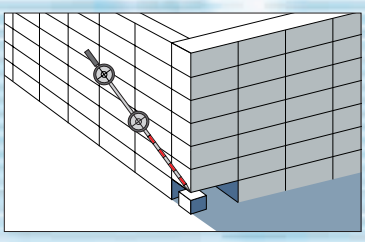
Powerful programs to cope with a wide variety of surveying situations.

Offset Measurement

Three types of offset measurement are available to suit the surveying situation and the results obtained can be displayed or stored as either angle and distance data or as coordinate data.

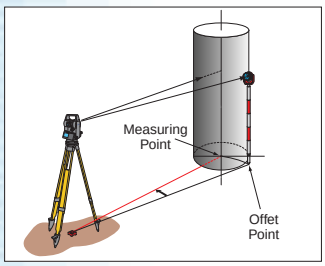
1. Sokkia's Unique 2-point Target

Hidden points such as concealed boundary points under walls can easily be measured.



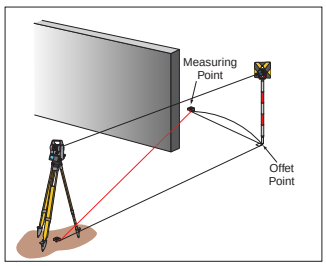
2. Offset/Angle

Set the prism on the left or right of the measuring point at the same distance. First measure the prism, then sight the measuring point, and its position is calculated.



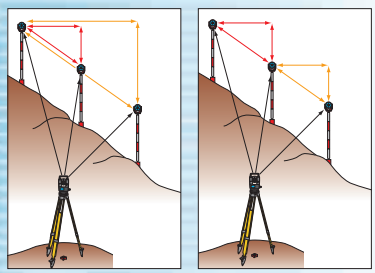
3. Offset/Distance

First set up an offset point in front of, behind, or to the left or right of the measuring point and measure it. The measuring point can then be found by inputting its horizontal distance from the offset point.



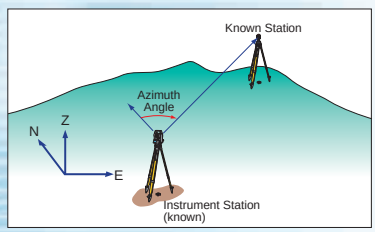
Missing Line Measurement (MLM)

The horizontal distance, slope distance, and height distance from the control target to another target can easily be measured. Continuous measurements can be made taking the original point as the datum, or measurements can be made in relation to the previously measured point.



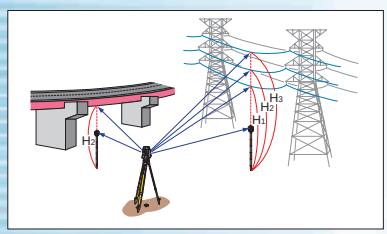
Azimuth Angle Setting

The horizontal angle can automatically be set to the azimuth of a backsight point by computation from the coordinates of the total station and the backsight point.



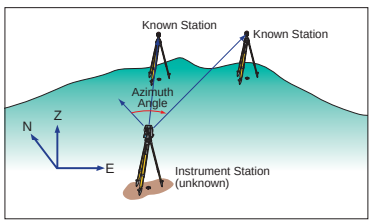
Remote Elevation Measurement (REM)

The height of a point from the ground can be found easily by measuring to a target directly below the unknown point and then simply sighting the point.



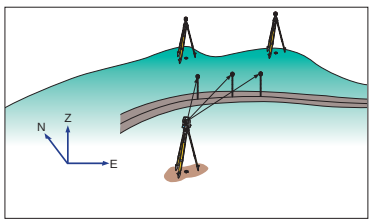
Resection

By setting up the instrument at an unknown point and measuring to at least two (max ten) known points, the coordinates of the instrument can be computed. On completion, the NE standard deviation is displayed and re-measuring or additional measuring is possible.



Setting Out

Setting out can be performed using coordinates or horizontal angles and distances. On site work can be greatly expedited by inputting the coordinate points in memory (up to 3000 points) before starting. In addition, 3-dimensional setting out is available for determining elevation and position for cut or fill work.



3-D Coordinate Measurement

Points can be measured directly as N,E,Z (E,N,Z) 3-D coordinates and the results can be stored in internal memory.

Real-time Data Export

The SET3110R/4110R can be connected to a computer or other data collector and results transmitted during total station operation.

Specifications

	SET3110R	SET4110R
Telescope	Fully transiting. Coaxial sighting and distance measuring optics.	
Length	165mm (6.5in.)	
Objective aperture	45mm (1.8in.) (EDM : 50mm (2.0in.))	
Magnification	30x	
Image	Erect	
Resolving power	3"	
Field of view	1° 30' (26m / 1,000m)	
Minimum focus	1.0m (3.3ft.)	
Reticle illumination	Built-in (Bright / Dim, selectable)	
Focusing ring	Fine / Coarse two speeds	
Angle measurement	Photoelectric incremental rotary encoder scanning.Both circles adopt diametrical detection and are provided with absolute 0 index points.	
Unit	H&V 360° / 400gon / mil, selectable	
Display resolution (selectable)	H&V 1" / 0.2mgon / 0.005mil	5" / 1mgon / 0.02mil
Accuracy *1	H&V 3"(1mgon)	5"(1.5mgon)
Measuring time	H&V Less than 0.5 seconds, continuous	
Automatic dual-axis level compensator	ON (V&H / only V) / OFF selectable Display : Digital / Graphic, selectable Type : Dual-axis liquid tilt sensor Range : ± 3' (± 55mgon), out-of-range warning displayed Display resolution : According to selection of display resolution	
Collimation program	ON / OFF selectable	
Display mode	H : Clockwise / Counterclockwise, selectable ; Repetition, 0 set, angle setting, available V : Zenith angle (Zenith 0°) , Vertical angle (Horizontal 0°) , Height angle (Horizontal 0° ± 90°), selectable	
Distance measurement	Modulated near infrared LASER, 3 frequencies, Coaxial EDM transmitting and receiving optics	
Laser	Source : Laser diode Wavelength : 830nm Class : Class 1 (IEC 60825-1) / Class I (FDA)	
Measuring range (slope distance , 2.0m ~)	Atmospheric conditions*2 — Average conditions — Good conditions White surface*3 — 85m (270ft.) — 85m (270ft.) With reflective sheet target RS90N — 500m (1,600ft.) — 500m (1,600ft.) With CP01 compact prism — 600m (1,900ft.)*4 — 1,000m (3,200ft.) With one AP01 prism — 1,600m (5,200ft.) — 4,000m (13,000ft.)	
Unit	Meters / Feet, selectable	
Measuring Mode	Fine measurement (Repeat/Single), Rapid measurement (Repeat/Single), selectable (USA Model : Fine measurement (Single), Rapid measurement (Single), selectable)	
Display resolution	Fine measurement 0.001m (0.01ft.) Rapid measurement 0.001m (0.01ft.)	
Unambiguous measuring range(Slope distance)	9,999.999m (32,808.33ft)	
Accuracy (D = measuring distance, unit : mm)	Fine meas. white surface*3 ± (5+3ppm X D)mm Fine meas. with Reflective sheet target RS90N ± (3+3ppm X D)mm Fine meas. with glass prism ± (5+3ppm X D)mm Rapid meas. ± (7+5ppm X D)mm	
Measuring time	Fine measurement Every 2.0s (initial meas. 3.7s) (Maximum 10 times) — USA Model : 3.7s Rapid measurement Every 1.2s (initial meas. 3.1s) (Maximum 20 times) — USA Model : 3.1s	
Atmospheric correction	(1) Temperature / pressure input, (2) Temperature / pressure / humidity input, (3) ppm input, (4) w/o compensation, selectable	
Prism constant correction	-99mm to +99mm (1mm steps)	
Refraction & earth-curvature correction	ON (K=0.14 / K=0.20) / OFF, selectable	
Audio target acquisition	Display and audio ; ON / OFF, selectable	
Automatic light intensity control	Provided	

Software and data transfer	
Software	Azimuth Angle Setting, Resection, 3-D Coordinate Measurement, Setting-out, Offset Measurements (Distance/Angle/Two-Point target), Remote Elevation Measurement, Missing Line Measurement
Data storage internal memory	About 3,000 points, both angles & distance data or coordinate data
Calendar, clock function	Provided
Two way communication	Provided
Interface	Asynchronous serial, RS-232C compatible, Centronics compatible (w / optional DOC46 printer cable) Baud rate:38,400 / 19,200 / 9,600 / 4,800 / 2,400 / 1,200bps
General	
Display unit	Alphanumeric / graphic dot matrix LCD (120 x 64 dots, 20 characters x 8 lines) on each face. Backlight,Non-reflective glass, provided
Keyboard	28 latex keys on each face (numeric, cursor, edit, power, softkey function, illumination)
Self-diagnostic function	Automatic, Messages / Codes displayed
Sensitivity of levels	Plate level 30" / 2mm Circular level (in tribrach) 10' / 2mm
Optical plummet	Image : Erect, Magnification : 3x, Minimum focus : 0.5m (1.64ft.)
Clamp / fine motion screws	H&V Co-axial, Fine / Coarse two-speed motion
Standing axis	Single
Operating temperature	-20°C to +50°C (-4°F to +122°F)
Water resistance	Protected against falling water drops as defined by Japanese Industrial Standard Class IPX2 in compliance with International Electrotechnical Commission Standard Class IPX2
Tilting / Trunnion axis height	236mm (9.3in.) from tribrach bottom, 193mm (7.6in.) from tribrach dish
Size with handle and BDC35 battery	W177 x D165 x H345mm (W7.0 x D6.5 x H13.6in.)
Weight with handle and battery	5.4kg (11.9lbs.)
Weight of parts	BDC35 battery : 240g (8.5oz), handle : 100g (3.5oz), tribrach : 700g (1.5lbs), carrying case : 3.7kg (8.2lbs)
Power Supply	Operating voltage : 6VDC
Battery level display	4 steps with warning message
Automatic power off	Automatic power off 30 minutes after operation, ON / OFF selectable
Resume function	ON / OFF selectable (backed up for about 1 week)
BDC35 Rechargeable Battery (standard)	Ni-MH rechargeable battery, 2 pcs. Supplied
Continuous use at 25°C (77°F) per battery	Angle & distance mode : About 5.5 hours (About 660 points) (Fine & single measurement, measurement interval : 30 seconds) Angle measurement only : About 7 hours
Charging time per battery	About 70 minutes with CDC39, CDC40 or CDC48

*1 Standard deviation of mean of a measurement taken in position I and II, according to ISO 12857-2 1997

*2 Average conditions : slight haze, visibility about 20km (12 miles), sunny periods, weak scintillation. Good conditions : no haze, visibility about 40km (25 miles), overcast, no scintillation.

*3 With white surface positioned at 90° to the SET and no reflecting sunlight.

*4 Please note that the SET3110R/4110R non prism electronic total station is particularly sensitive to the detrimental influence of heat haze when using CP01 compact prism to measure distances in excess of 300m (980ft.).

As Non prism total station emits narrow beam such to be almost parallel, we, Sokkia, recommend the use of single AP prism for more accurate value of measurement. And we do not recommend multi-element prisms.

Designs and specifications are subject to change without notice.

Standard Configuration
The SET3110R/4110R comes with: a tribrach, two rechargeable batteries BDC35, a quick charger CDC39 / 40 / 48, tubular compass CP7, sunshade, lens cap, plumb bob, vinyl cover, tool kit, operator's manual, carrying case and shoulder strap.

Optional Accessories
Glass Prisms
Reflective Sheet Targets
Rechargeable Batteries
Chargers
External Power Adapters
Communication Cables DOC1 / 26 / 27
Printer Cable DOC46
Tripods
Diagonal Eyepiece DE17A
Solar Filter (flip-up type) OF3A
Back Pack SC153A

Sokkia is a sponsor of the International Federation of Surveyors.

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