

# Specifications

# SPS930 DR+ Total Station



## Angle Measurement

Horizontal Accuracy (Standard deviation based on ISO 17123-3)	1" (0.3 mgon)
Vertical Accuracy (Standard deviation based on ISO 17123-3)	1" (0.3 mgon)

## Angle Reading (least count)

Standard	1" (0.3 mgon)
Tracking	2" (0.6 mgon)

## Automatic Level Compensator

Dual-axis compensator +/- 5.4' (+/- 100 mgon)

## Distance Measurement Accuracy (Standard Deviation), Prism Mode

Standard	$\pm(2 \text{ mm} + 2 \text{ ppm}) \pm(0.0065 \text{ ft} + 2 \text{ ppm})$
Tested standard deviation according to ISO17123-4	$\pm(1 \text{ mm} + 2 \text{ ppm}) \pm(0.003 \text{ ft} + 1 \text{ ppm})$
Tracking	$\pm(4 \text{ mm} + 2 \text{ ppm}) \pm(0.013 \text{ ft} + 2 \text{ ppm})$

## Dynamic Measurement Capability (Standard Deviation)

Synchronized Angle and Distance Measurements	Yes
Maximized Position Update Rate	20 Hz

## DR Mode

Standard Measurement	$\pm(2 \text{ mm} + 2 \text{ ppm}) \pm(0.0065 \text{ ft} + 2 \text{ ppm})$
Tracking	$\pm(4 \text{ mm} + 2 \text{ ppm}) \pm(0.013 \text{ ft} + 2 \text{ ppm})$

## Measuring Time, Prism Mode

Standard	1.2 seconds
Tracking	0.4 seconds

## Measuring Time, DR Mode

Standard	1 to 5 seconds
Tracking	0.4 seconds

## Range (under clear conditions), Prism Mode

1 prism	2,500 m (8,202 ft)
1 prism Long Range mode	5,500 m (18,044 ft) max range
3 prism	3500 m (11,482 ft)
Shortest possible range	0.2 m (0.65 ft)

## Range (under clear conditions), DR Mode

Kodak Gray Card (18% reflective)	>600 m (1969 ft)
Kodak Gray Card (90% reflective)	>1300 m (4265 ft)

## Range (under difficult conditions), DR Mode

Kodak Gray Card (18% reflective)	>550 m (1804 ft)
Kodak Gray Card (90% reflective)	>1200 m (3937 ft)

## Typical ranges, DR Mode

Concrete	600 – 800 m (1968 – 2624 ft)
Wood construction	400 – 800 m (1312 – 2624 ft)

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Metal construction	400 – 500 m (1312 – 1640 ft)
Light rock	400 – 600 m (1312 – 1968 ft)
Dark rock	300 – 400 m (984 – 1312 ft)
Reflective foil 20 mm x 20 mm (0.7 in x .07 in)	1000 m (3280 ft)
Reflective foil 60 mm x 60 mm (2.3 in x 2.3 in)	1600 m (5,249 ft)
Shortest possible range	1m (6.56 ft)
<b>DR Extended Range Mode</b>	
Kodak Gray Card (18% reflective)	900-1000 m (2952 - 3280 ft)
Kodak Gray Card (90% reflective)	2000 - 2200 m (6560 - 7216 ft)
Accuracy	±(10 mm + 2 ppm) ±(0.033 ft + 2 ppm)
<b>DR surface scan and surface profile speed</b>	3 Hz / 1.3 points per second - turn and measure
<b>Light Source</b>	Pulsed laser diode 905 nm, Laser class 1
<b>Laser pointer coaxial (standard)</b>	Laser class 2
<b>Beam Divergence in Prism Mode</b>	
Horizontal	4 cm/100 m (0.13 ft/328 ft)
Vertical	8 cm/100 m (0.26 ft/328 ft)
<b>Beam Divergence in DR Mode</b>	
Horizontal	
Vertical	
Atmospheric Correction	-130 ppm to 160 ppm continuous
<b>Leveling</b>	
Circular level in Tribrach	8/2 mm (8/0.007 ft)
Electronic 2-axis level in the LCD	0.3" (0.1 mgon)
Servo system	MagDrive servo technology, integrated servo/angle sensor electromagnetic direct drive
Rotation speed	115 degrees/sec (128 gon/sec)
Positioning speed 360/180 degrees (400/200 gon)	3.2 sec / 2.6 sec
Positioning speed - Change Face I to Face II	2.6 sec
Clamps and slow motions	Servo-driven, endless fine adjustment
<b>Centering</b>	
Centering system	Trimble 3-pin
Optical plummet	Alidade optical plummet
Magnification/shortest focusing distance	2.3x/0.5 m – infinity (1.6 ft – infinity)
<b>Telescope</b>	
Magnification	30x
Aperture	40 mm (1.57 inches)
Field of view at 100 m (328 ft)	2.6 m at 100 m (8.5 ft at 328 ft)
Shortest focusing distance	1.5 m (4.92 ft)–infinity
Illuminated crosshair	Variable (10 steps)

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Built-in tracklight	Standard
Operating temperature	-20 °C to +50 °C (-4 °F to +122 °F)
Dust and water proofing	IP65
Focus type	Servo assisted on side cover and autofocus
<b>Power Supply</b>	
Internal battery	Rechargeable Li-Ion battery 11.1 V, 4.4 Ah
<b>Operating Time</b>	
One internal battery	Approximately 6 hours
Three internal batteries in multi-battery adaptor	Approximately 18 hours
Robotic holder with one internal battery	Approximately 12 hours
<b>Weight</b>	
Instrument (Servo/Autolock)	5.15 kg (11.35 lb)
Instrument (Robotic)	5.25 kg (11.57 lb)
Trimble CU Controller	0.4 kg (0.88 lb)
Tribrach	0.7 kg (1.54 lb)
Internal battery	0.35 kg (0.77 lb)
<b>Trunnion axis Height</b>	196 mm (7.71 in)
<b>Handle</b>	Detachable and eccentric for unrestricted sighting
<b>Range</b>	
Robotic	500–700 m (1,640–2,297 ft)
Autolock	500–700 m (1,640–2,297 ft)
Autolock to Trimble AT360 Target	500 m (1,640 ft)
Autolock to Trimble MT1000 Target	800 m (2625 ft)
Shortest search distance	0.2 m (.65 ft)
Autolock pointing precision at 200 m (656 ft) (Standard deviation)	<2 mm (0.007 ft)
<b>Angle Reading</b>	
Standard	1" (0.3 mgon)
Tracking	2" (0.6 mgon)
Averaged observations	0.1" (0.03 mgon)
Type of radio	2.4 GHz frequency-hopping, spread-spectrum radios
Search time	2 – 10 s
Search area	360 degrees (400 gon) or defined horizontal and vertical search window
<b>Communication</b>	USB, Serial, Bluetooth®
<b>Machine Control Specifications</b>	
Machine Control Capable	Optional
Range to target (MT900)	5m – 500-700 m, from 2m with reduced performance
Search time	2 to 10 seconds

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Search area	360 degrees (400 gon) or defined horizontal and vertical search window
Maximum acceleration of target at short distance 2 m (6.5 ft) radial acceleration	148°/sec
<b>Maximum velocity of target</b>	
Radial speed	114°/sec
Axial speed	6m/s
<b>Data Output</b>	
Rate	20 Hz
Data Timing	+/- 1 ms
Data Latency	40 ms over Cirronet radio, 23 ms over USB connection
Synchronized measurement data	<1 ms
<b>Accuracy to a target moving at 1 m/s (Standard deviation)</b>	
Horizontal	$\pm (2 \text{ mm} + 14 \text{ ppm}) \pm (0.007 \text{ ft} + 14 \text{ ppm})$
Vertical	$\pm (2 \text{ mm} + 14 \text{ ppm}) \pm (0.007 \text{ ft} + 14 \text{ ppm})$
Slope Distance	$\pm (2 \text{ mm} + 14 \text{ ppm}) \pm (0.007 \text{ ft} + 14 \text{ ppm})$
<b>Models Available</b>	Servo, Autolock, Robotic, UTS
<b>Upgradable</b>	Yes

Specifications subject to change without notice.

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