



# Trimble S9/S9 HP

## TOTAL STATION

### PERFORMANCE AND PRECISION

The Trimble® S9 total stations integrate the best field technologies plus our highest level of accuracy and specialized engineering features for the ultimate in performance and precision. You can combine scanning, imaging and surveying into one solution, or focus on the highest level of accuracy with options such as LongRange FineLock™ and our Trimble DR High Precision (HP) EDM for applications where precision is priority. Back in the office, trust our powerful Trimble Business Center and Trimble 4D office software to help you process and analyze your data.

### Specialized for Engineering Applications

The Trimble S9 total station is built for specialized applications such as monitoring and tunneling, where you need a solution with optimal speed, accuracy and reliability. Combine the Trimble DR HP EDM in the S9 HP with your choice of 1" or 0.5" angular accuracies and Long Range FineLock and you have the flexibility to tackle the most demanding projects.

### Trimble DR Plus and DR HP EDM

Trimble DR Plus range measurement technology provides extended range of Direct Reflex measurement without a prism to exceptionally long distances, while the DR HP EDM in the S9 HP offers higher accuracy when measuring to prisms. Trimble's high performance EDMs, combined with the smooth and frictionless drive capabilities of MagDrive™ servo technology, creates unmatched capability for quick measurements, without compromising on accuracy.

### Advanced Engineering Features

Additional engineering-specific features in the Trimble S9 total stations include Trimble FineLock technology and the 3R laser pointer. Trimble FineLock detects targets without interference from surrounding prisms for high precision applications in close quarters. The Trimble LongRange FineLock option extends this functionality. With the Class 3R laser

pointer in the Trimble S9 HP, you can visually mark points at greater range in tunnels or underground mines.

### Manage Your Assets 24/7

Know where your total stations are 24 hours a day with Trimble L2P technology. See where your equipment is at any given time and get alerts if your instrument leaves a job site or experiences unexpected equipment shock or abuse.

Trimble AllTrak™ software lets you view usage and keep up-to-date on firmware, software and maintenance requirements. With Trimble L2P and AllTrak, you can rest assured knowing your equipment is up-to-date and where it should be.

### Trimble VISION and SureScan Technology

The Trimble S9 comes with optional Trimble VISION™ and SureScan technology. The improved Trimble VISION gives you the power direct your survey with live video images on the controller as well as create a wide variety of deliverables from collected imagery. Trimble SureScan in the S9 total station provides the flexibility to perform feature-rich scans every day, without the complexity of setting up a separate scanning system or switching to specialized field software. SureScan ensures that you have even coverage and get the most efficiency from your scanning.

### Powerful Field and Office Software

Trimble controllers and our specialized modules in Trimble Access™ field software such as Tunnels, Monitoring, Pipelines and Mines provide dedicated workflows to help you get the job done faster. Trimble Access workflows can also be customized to fit your needs.

In the office, use Trimble Business Center to help you check, process and adjust your data in one software solution. Trimble 4D Control™ office software provides a comprehensive solution for the management of monitoring projects—both real time and post-processed—to rapidly detect critical structural movements.

## Key Features

- ▶ Available 0.5" or 1" angle accuracy
- ▶ Trimble DR Plus or HP EDM for optimal speed, accuracy and reliability
- ▶ Optional Trimble VISION and SureScan technology
- ▶ Trimble L2P real-time equipment management
- ▶ Intuitive Trimble Access Field Software
- ▶ Trimble Business Center Office Software for quick data processing
- ▶ Trimble 4D Control for monitoring management



TRIMBLE S9 AND S9 HP CONFIGURATIONS

	EDM	Accuracy	Servo	Trimble VISION	Sure Scan	FineLock	Long Range FineLock	3R Laser Pointer	Tracklight
S9	DR Plus	0.5"	Robotic	Yes	Yes	Yes	No	No	No
	DR Plus	0.5"	Robotic	No	No	Yes	Yes	No	No
	DR Plus	0.5"	Robotic	No	No	Yes	No	No	Yes
	DR Plus	1"	Robotic or Autolock*	No	No	Yes	Yes	No	No
S9 HP	DR HP	0.5"	Robotic	No	No	Yes	Yes	No	No
	DR HP	0.5"	Robotic or Autolock	No	No	Yes	No	No	Yes
	DR HP	0.5"	Robotic	Yes	No	Yes	No	No	No
	DR HP	1"	Robotic or Autolock	Yes	No	Yes	No	No	No
	DR HP	1"	Robotic or Autolock	No	No	Yes	No	No	Yes
	DR HP	1"	Robotic or Autolock	No	No	Yes	Yes	No	No
	DR HP	1"	Robotic	No	No	Yes	No	Yes	No

PERFORMANCE (DR PLUS)

Angle measurement

Sensor type	Absolute encoder with diametrical reading
Accuracy (Standard deviation based on DIN 18723)	0.5" (0.15 mgon) or 1" (0.3 mgon)
Display (least count)	0.1" (0.01 mgon)
Automatic level compensator	
Type	Centered dual-axis
Accuracy	0.5" (0.15 mgon)
Range	±5.4' (±100 mgon)

Distance measurement

Accuracy (ISO)	
Prism mode	
Standard <sup>1</sup>	1 mm + 2 ppm (0.003 ft + 2 ppm)
Accuracy (RMSE)	
Prism mode	
Standard	2 mm + 2 ppm (0.0065 ft + 2 ppm)
Tracking	4 mm + 2 ppm (0.013 ft + 2 ppm)
DR mode	
Standard	2 mm + 2 ppm (0.0065 ft + 2 ppm)
Tracking	4 mm + 2 ppm (0.013 ft + 2 ppm)
Extended Range	10 mm + 2 ppm (0.033 ft + 2 ppm)

Measuring time

Prism mode	
Standard	1.2 s
Tracking	0.4 s
DR mode	
Standard	1-5 s
Tracking	0.4 s

Measurement Range

Prism mode (under standard clear conditions <sup>2,3</sup> )	
1 prism	2,500 m (8,202 ft)
1 prism Long Range mode	5,500 m (18,044 ft) (max. range)
Shortest range	0.2 m (0.65 ft)
DR mode	

	Good (Good visibility, low ambient light)	Normal (Normal visibility, moderate sunlight, some heat shimmer)	Difficult (Haze, object in direct sunlight, turbulence)
White card (90% reflective) <sup>4</sup>	1,300 m (4,265 ft)	1,300 m (4,265 ft)	1,200 m (3,937 ft)
Gray card (18% reflective) <sup>4</sup>	600 m (1,969 ft)	600 m (1,969 ft)	550 m (1,804 ft)

Reflective foil 20 mm	1000 m (3280 ft)
Shortest possible range	1 m (3.28 ft)
DR Extended Range Mode	
White Card (90% reflective) <sup>4</sup>	2200 m

Scanning

Range <sup>2,3</sup>	from 1 m up to 250 m (3.28 ft-820 ft)
Speed	up to 15 points/sec
Minimum point spacing	10 mm (0.032 ft)
Standard deviation	1.5 mm @ ≤50 m (0.0049 ft @ ≤164 ft)
Single 3D point accuracy	10 mm @ ≤150 m (0.032 ft @ ≤492 ft)

# Trimble S9/S9 HP TOTAL STATION

## EDM SPECIFICATIONS (DR PLUS)

Light source	Pulsed laserdiode 905 nm
Beam divergence Prism mode	
Horizontal	.4 cm/100 m (0.13 ft/328 ft)
Vertical	8 cm/100 m (0.26 ft/328 ft)
Beam divergence DR mode	
Horizontal	.4 cm/100 m (0.13 ft/328 ft)
Vertical	8 cm/100 m (0.26 ft/328 ft)
Atmospheric correction	-130 ppm to 160 ppm continuously

## PERFORMANCE (DR HP)

Angle measurement	
Angle accuracy (Standard deviation based on DIN 18723)	0.5" (0.15 mgon) or 1" (0.3 mgon)
Angle display (least count)	0.1" (0.01 mgon)

## Distance measurement

Accuracy (ISO)	
Prism mode	
Standard <sup>1</sup>	0.8 mm + 1 ppm (0.0026 ft +1 ppm)
Accuracy (RMSE)	
Prism mode	
Standard	1 mm + 1 ppm (0.003 ft +1 ppm)
Tracking	.5 mm + 2 ppm (0.016 ft + 2 ppm)
DR mode	
Standard	3 mm + 2 ppm (0.01 ft + 2 ppm)
Tracking	10 mm + 2 ppm (0.032 ft + 2 ppm)

## Measuring time

Prism mode	
Standard	.3 s
Tracking	.04 s
DR mode	
Standard	3-15 s
Tracking	.04 s

## Range

Prism mode (under standard clear conditions <sup>2-3</sup> )	
1 prism	3,000 m (9,800 ft)
1 prism Long Range mode	5,000 m (16,400 ft)
3 prism Long Range mode	7,000 m (23,000 ft)
Shortest range	1.5 m (4.9 ft)
DR mode	

	Good (Good visibility, low ambient light)	Normal (Normal visibility, moderate sunlight, some heat shimmer)	Difficult (Haze, object in direct sunlight, turbulence)
White card (90% reflective) <sup>4</sup>	>150 m (492 ft)	150 m (492 ft)	70 m (229 ft)
Gray card (18% reflective) <sup>4</sup>	>120 m (394 ft)	120 m (394 ft)	50 m (164 ft)

Shortest range ..... 1.5 m (4.9 ft)

## EDM SPECIFICATIONS (DR HP)

Light source	Laserdiode 660 nm
Beam divergence	
Horizontal	.4 cm/100 m (0.13 ft/328 ft)
Vertical	.4 cm/100 m (0.13 ft/328 ft)

# Trimble S9/S9 HP TOTAL STATION

## SYSTEM SPECIFICATIONS

**Leveling**

Circular level in tribrach ..... 8'/2 mm (8'/0.007 ft)  
 Electronic 2-axis level in the LC-display  
 with a resolution of ..... 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)  
 Rotation time Face 1 to Face 2 ..... 2.6 sec  
 Positioning speed 180 degrees (200 gon) ..... 2.6 sec  
 Clamps and slow motions ..... Servo-driven, endless fine adjustment

**Centering**

Centering system ..... Trimble 3-pin  
 Optical plummet ..... Built-in optical plummet  
 Magnification focusing distance ..... 2.3x/0.5 m–infinity (1.6 ft–infinity)

**Telescope**

Magnification ..... 30x  
 Aperture ..... 40 mm (1.57 in)  
 Field of view at 100 m (328 ft) ..... 2.6 m at 100 m (8.5 ft at 328 ft)  
 Focusing distance ..... 1.5 m (4.92 ft)–infinity  
 Illuminated crosshair ..... Variable (10 steps)  
 Autofocus ..... Standard

**Camera (not available in all models)**

Chip ..... Color Digital Image Sensor  
 Resolution ..... 2048 x 1536 pixels  
 Focal length ..... 23 mm (0.09 ft)  
 Depth of field ..... 3 m to infinity (9.84 ft to infinity)  
 Field of view ..... 16.5° x 12.3° (18.3 gon x 13.7 gon)  
 Digital zoom ..... 4-step (1x, 2x, 4x, 8x)  
 Exposure ..... Spot, HDR, Automatic  
 Brightness ..... User-definable  
 Image storage ..... Up to 2048 x 1536 pixels  
 File format ..... JPEG

**Power supply**

Internal battery ..... Rechargeable Li-Ion battery 11.1 V, 5.0 Ah  
 External power supply ..... 12 V only external  
 Operating time<sup>5</sup>

- One internal battery ..... Approx. 6.5 hours
- Three internal batteries in multi-battery adapter ..... Approx. 18 hours
- Robotic holder with one internal battery ..... 13.5 hours

Operating time for video robotic<sup>5</sup>

- One battery ..... 5.5 hours
- Three batteries in multi-battery adapter ..... 17 hours

**Weight and Dimensions**

Instrument (Autolock) ..... 5.4 kg (11.35 lb)  
 Instrument (Robotic) ..... 5.5 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)  
 Trunnion axis height ..... 196 mm (7.71 in)

**Laser Class (DR PLUS)**

EDM ..... Laser class 1  
 Laser pointer coaxial (standard) ..... Laser class 2  
 Overall product laser class ..... Laser class 2

**Laser Class (DR HP)**

EDM ..... Laser class 1 in Prism mode, Laser class 2 in DR mode  
 Laser pointer coaxial (standard) ..... Laser class 2  
 Overall product laser class ..... Laser class 2

## AUTOLOCK AND ROBOTIC SURVEYING

Passive prisms ..... 500 m–700 m (1,640–2,297 ft)  
 Trimble MultiTrack Target ..... 800 m (2,625 ft)  
 Trimble ActiveTrack 360 Target (DR Plus EDM) ..... 500 m (1,640 ft)  
 Trimble ActiveTrack 360 Target (DR HP EDM) ..... 100 m (328 ft)  
 Autolock pointing precision at 200 m (656 ft) (Standard deviation)<sup>3</sup>

- Passive prisms ..... <2 mm (0.007 ft)
- Trimble MultiTrack Target ..... <2 mm (0.007 ft)
- Trimble ActiveTrack 360 Target ..... <2 mm (0.007 ft)

Shortest search distance ..... 0.2 m (0.65 ft)  
 Type of radio internal/external ..... 2.4 GHz frequency-hopping,  
 spread-spectrum radios

Search time (typical)<sup>7</sup> ..... 2–10 sec

## FINELOCK

FineLock pointing precision at 300 m (980 ft)  
 (standard deviation)<sup>3</sup> ..... <1 mm (0.003 ft)  
 Range to passive prisms (min–max)<sup>3</sup> ..... 20 m–700 m (64 ft–2,297 ft)  
 Minimum spacing between prisms  
 at 200 m (656 ft) ..... 0.8 m (2.625 ft)

Long Range FineLock (not available in all models)  
 Pointing precision at 2,500 m (8,200 ft)  
 (standard deviation)<sup>3</sup> ..... <10 mm (0.039 ft)  
 Range to passive prisms (min.–max.)<sup>3,8</sup> ..... 250 m–2,500 m (64 ft–8,200 ft)  
 Minimum spacing between prisms  
 at 2,500 m (8,200 ft) ..... <10.0 m (32.808 ft)

## GPS SEARCH/GEOLOCK

GPS Search/GeoLock ..... 360 degrees (400 gon)  
 or defined horizontal and vertical search window

Solution acquisition time<sup>9</sup> ..... 15–30 sec  
 Target re-acquisition time ..... <3 sec  
 Range ..... Autolock & Robotic range limits

## OTHER SPECIFICATIONS

Tracklight built in ..... Not available in all models  
 Operating temperature ..... –20 °C to +50 °C (–4 °F to +122 °F)  
 Storage temperature ..... –40 °C to +70 °C (–40 °F to +158 °F)  
 Dust and water proofing ..... IP65  
 Humidity ..... 100% condensing  
 Communication ..... USB, Serial, Bluetooth<sup>®</sup>  
 Security ..... Dual-layer password protection, L2P<sup>10</sup>  
 Tracking rate ..... 10 Hz

1 Standard deviation according to ISO17123-4.  
 2 Standard clear: No haze. Overcast or moderate sunlight with very light heat shimmer.  
 3 Range and accuracy depend on atmospheric conditions, size of prisms and background radiation.  
 4 Kodak Gray Card, Catalog number E1527795.  
 5 The capacity in –20 °C (–5 °F) is 75% of the capacity at +20 °C (68 °F).  
 6 Bluetooth type approvals are country specific. Contact your local Trimble Authorized Distribution Partner for more information.  
 7 Dependent on selected size of search window.  
 8 Long Range FineLock can be used with standard FineLock from 20 m.  
 9 Solution acquisition time is dependent upon solution geometry and GPS position quality.  
 10 Functionality and availability dependent on region.

S9 and S9HP:



S9 with LongRange FineLock :



Specifications subject to change without notice.



Contact your local Trimble Authorized Distribution Partner for more information

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