Trimble S9 and 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 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.

**Stay on Point**

Reduce aiming error, avoid costly re-measurement and be confident in your results with Trimble SurePoint™. The Trimble S9 total stations aim and stay on target through wind, handling, and sinkage, actively correcting for unwanted movement ensuring accurate pointing and measurement every time. With exclusive MultiTrack™ technology and Target ID capabilities, surveyors can choose the type of target, passive or active, that best suits the job site conditions and be confident that they will find and lock to the correct target.

**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 Locate2Protect 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.

Our Trimble InSphere Equipment Manager system lets you view usage and keep up-to-date on firmware, software and maintenance requirements. With Trimble Locate2Protect and InSphere Equipment Manager, 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
- Locate2Protect real-time equipment management
- Intuitive Trimble Access Field Software
- Trimble Business Center Office Software for quick data processing
- Trimble 4D Control for monitoring management
**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 (RMSE):
  - Prism mode:
    - Standard: 1 mm + 2 ppm (0.003 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): 2,500 m (8,202 ft)
  - 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:
    - White card (90% reflective): 1,300 m (4,265 ft)
    - Gray card (18% reflective): 600 m (1,969 ft)
  - Normal:
    - White card (90% reflective): 1,300 m (4,265 ft)
    - Gray card (18% reflective): 600 m (1,969 ft)
  - Difficult:
    - White card (90% reflective): 1,200 m (3,937 ft)
    - Gray card (18% reflective): 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: 2200 m
Scanning
- Range: 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)

EDM SPECIFICATIONS
- Light source: Pulsed laserdiode 905 nm, Laser class 1
- 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 (RMSE):
  - Prism mode:
    - Standard: 0.8 mm + 1 ppm (0.0026 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: 2.5 s
  - Tracking: 0.4 s
- DR mode:
  - Standard: 3–15 s
  - Tracking: 0.4 s

Range
- Prism mode (under standard clear conditions):
  - 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)
- DR mode:
  - Good: 1.5 m (4.9 ft)

<table>
<thead>
<tr>
<th></th>
<th>Good (Good visibility, low ambient light)</th>
<th>Normal (Normal visibility, moderate sunlight, some heat shimmer)</th>
<th>Difficult (Haze, object in direct sunlight, turbulence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White card (90% reflective)</td>
<td>&gt;150 m (492 ft)</td>
<td>150 m (492 ft)</td>
<td>70 m (229 ft)</td>
</tr>
<tr>
<td>Gray card (18% reflective)</td>
<td>&gt;120 m (394 ft)</td>
<td>120 m (394 ft)</td>
<td>50 m (164 ft)</td>
</tr>
</tbody>
</table>

- Shortest range: 1.5 m (4.9 ft)

EDM SPECIFICATIONS (DR HP)
- Light source: Laserdiode 660 nm; Laser class 1 in Prism mode, Laser class 2 in DR mode
- Beam divergence:
  - Horizontal: 4 cm/100 m (0.13 ft/328 ft)
  - Vertical: 4 cm/100 m (0.13 ft/328 ft)
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SYSTEM SPECIFICATIONS

Leveling
Circular level in tribrach
Electronic 2-axis level in the LC-display
with a resolution of
8'/0.007 ft
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 (also available as an option in the DR High Precision version)
Chip
Color Digital Image Sensor
Resolution
2048 x 1536 pixels
Focal length
23 mm (0.90 ft)
Depth of field
3 m to infinity (9.84 ft to infinity)
Digital zoom
4-step (1x, 2x, 4x, 8x)
Exposure
Spot, HDR, Automatic
Brightness
User-definable
Image storage
Up to 2048 x 1536 pixels JPEG
Power supply
Internal battery
Rechargeable Li-Ion battery
Operating time
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
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)
Trabric
0.7 kg (1.54 lb)
Internal battery
0.35 kg (0.77 lb)
Trunnion axis height
196 mm (7.71 in)

AUTOLELOCK 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)
200 m (656 ft)

Autolelock pointing precision at 200 m (656 ft) (Standard deviation)²
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)²
2–10 sec

FINELOCK

Finelock pointing precision at 300 m (980 ft)
(standard deviation)²
<1 mm (0.003 ft)
Range to passive prisms (min–max)³
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)²
<10 mm (0.039 ft)
Range to passive prisms (min–max)³
250 m–2,500 m (820 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 time¹
15–30 sec

Target re-acquisition time
Autolelock & Robotic range limits

OTHER SPECIFICATIONS

Laser pointer coaxial (standard)
Laser pointer non-coaxial (not available in all models)
Laser class 3R

Tracklight built in
Not available in all models

Operating temperature
–20º C to +50º C (–4º F to +122º F)

Dust and water proofing
100% condensing

Communication
USB, Serial, Bluetooth®

Security
Dual-layer password protection, Locate2Protect®

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 dependent on atmospheric conditions, size of prisms and background radiation.
4. Kodak Gray Card, Catalog number E1527795.
5. The capacity in –20º C (–4º F) is 75% of the capacity at +20º C (68º 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.

Specifications subject to change without notice.

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Laser Notice no.50, dated June 24, 2007
Maximum output power: 5 mW
Wavelength: 630-680 nm
AVOID DIRECT EYE EXPOSURE

Laser Notice no. 50, dated July 26, 2001
except for deviations pursuant to

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