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Trimble ATS Construction Total Station

**High accuracy dynamic tracking system
for stakeless grade control, site
positioning and marine applications**

General Description

The Trimble® ATS Construction Total Station is a dual-mode instrument which allows you to increase accuracy and productivity on the jobsite. The ATS has enhanced features for high-performance, automatic grade control and marine vessel tracking.

Robotic Operation – The Trimble ATS offers maximum flexibility as a fast, efficient one-person robotic positioning system. Using the SCS900 Site Controller Software, the operator can carry out any site measurement or stakeout operation, and initialize the instrument for grade control operations.

Advanced Grade Control and Guidance for Machines – The ATS combines with on-machine sensors and operator display for 3D stakeless grade control – with all the design and cut / fill information right in the cab. The ATS is optimized for dynamic tracking applications by incorporating the following features:

Data Latency – The age of the data being output from the ATS is tightly controlled at <200 ms so that it is always constant and very small. Traditional total stations have larger latencies that are not controlled, and introduce errors into the 3D position determination.

Angle and Distance Sensor Synchronization – The ATS central processor unit takes measurements from the angle and distance sensors at precisely the same time, resulting in very precise 3D position determination to a moving target. Traditional total stations take measurements from the angle and distance sensors in sequence which results in a 3D position error that increases with increasing speed of the machine.

Position Update Rate – The ATS outputs position information at 6 Hz, making it ideal for tracking moving machines or vessels at speeds up to 46 km/h. Traditional total stations output data at rates in the order of 2-3 Hz, which is adequate for static or slow moving targets, but not for dynamic tracking of machines.



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Angle and Distance Sensor Accuracy – The ATS is equipped with very precise angle reading systems, accurate in both horizontal and vertical to 1 arc second. The high-accuracy measurement system contributes to the 3D positioning accuracy, especially in the height component when working at longer ranges.

Target Recognition – The programmable target recognition capability of the ATS lets you operate several instruments on the same site in the same vicinity with guaranteed lock to the right target all of the time.

Comprehensive Grade Control –The Trimble ATS can be used as part of the Trimble BladePro® 3D grade control system to give the machine operator full control over the earthworks on a site. The BladePro 3D system features a display screen in the machine cab that shows the exact 3D position of the blade in relation to the design at that time. In addition, you can add slope and rotation sensors plus valve drivers for fully automatic machine control. The slope and elevation of the blade are controlled by the system, not by the machine operator, reducing errors and avoiding expensive rework.

Standard Features

- Site measurement and stakeout capability
 - Servo, Autolock® and Robotic options
 - Upgradeable system
- Grade control and guidance capability
 - Low fixed latency
 - Synchronized measurement data
 - 6 Hz data output
 - Built-in search system and customized tracking algorithms
 - Active target tracking with multiple target IDs for 100% secure lock on

Specifications

Physical characteristics	Specifications
Angle Measurement Accuracy (Standard deviation based on DIN 18723) Horizontal Accuracy Vertical Accuracy Angle Reading least count Standard Tracking	 1" (0.3 mgon) 1" (0.3 mgon) 1" (0.1 mgon) 2" (0.5 mgon)
Automatic level compensator	Dual-axis compensator ±6' (±100 mgon)
Distance Measurement Accuracy (Standard Deviation) Standard Tracking	 ±(3 mm + 2 ppm), ±(0.01 ft + 2 ppm) ±(10 mm + 2 ppm), ±(0.032 ft + 2 ppm)

Physical characteristics	Specifications
Measuring Time Standard Tracking	3.5 s 0.4 s
Range (under standard clear conditions) ^{1,2} 1 prism 1 prism – Long-range mode Triple prism Triple prism – Long-range mode Shortest possible range	2,000 m (1.2 miles) 2,800 m (1.7 miles) 2,800 m (1.7 miles) 3,900 m (2.4 miles) 0.2 m (0.65 ft)
Data communication interface	Serial port (RS232 Standard) 9600 baud
Control unit Type Geodimeter CU Trimble ACU	Detachable or external controller options 33-key alphanumeric keyboard 4-row illuminated LCD screen with 20 characters per row Standard memory of 5,000 points Optional memory of 10,000 points See Trimble ACU data sheet for specification details.
Dynamic Measurement Capability Synchronized angle and distance measurements Position update rate Latency 3D Positioning Accuracy at 200 m Accuracy to a target moving at 1m/s (Standard deviation)* Horizontal Vertical Slope distance <i>* The accuracy stated is valid for a static target moving at constant speed. During acceleration or retardation, or a target with high speed >15 kmh (9.3 mph), the accuracy will decrease.</i>	Yes (<5ms) 1 to 6 Hz selectable 83 ms +/- 1ms (via direct RS232 connection) 183 ms +/- 1ms (including Georadio UHF modem) <2 mm (0.007 ft) ±2 mm + 14 ppm (0.007 ft + 14 ppm) ±2 mm + 14 ppm (0.007 ft + 14 ppm) ±2 mm + 14 ppm (0.007 ft + 14 ppm) Note: 3D positioning accuracy is based on the following parameters: <ul style="list-style-type: none"> • Angle accuracy (horizontal and vertical position accuracies vary with angles measured) • Distance measurement accuracy (ppm error causes accuracy to vary with range measured) • Tracker lock on accuracy • Stationary or moving target

General characteristics	Specifications
Light source	GaAs diode
Beam divergence Horizontal Vertical	25.0 cm / 100 m (0.82 ft/328 ft) 25.0 cm / 100 m (0.82 ft/328 ft)
Atmospheric correction	-60 ppm to 195 ppm continuous
Leveling Circular level in Tribrach Electronic 2-axis level in the LC- display with a resolution of:	8/2 mm (8/0.007 ft) 6" (2.0 mgon)
Centering Centering system Optical plummet Magnification/shortest focusing distance	Trimble 3-pin Optical plummet in tribrach 2.3× / 0.5 m–infinity (1.6 ft–infinity)
Servo system Rotation speed Pointing speed 180° (200 gon) Clamps and slow motions	50°/sec (55.6 gon/sec) 5 sec Servo-driven, endless fine adjustment
Telescope Magnification Field of view at 100 m (328 ft) Shortest focusing distance Illuminated crosshair Tracklight built in	26× (30x optional) 2.6 m at 100 m (8.5 ft at 328 ft) 1.7 m (5.6 ft)–infinity Variable (10 steps) Standard
Power supply Input voltage Internal battery Power consumption	12-14V DC External rechargeable NiMH batteries 12.0 V, 3.5 Ah 4.8 W to 10.8 W
Weights and dimensions Instrument (Robotic) Trimble ACU controller Tribrach	7.40 kg (16.5 lb) 0.59 kg (1.30 lb) 0.70 kg (1.54 lb)

Tracker and Radio Performance	Specifications
Autolock and Robotic Range ^{1,2} Robotic Autolock Shortest search distance Autolock pointing precision at 200 m (656 ft) (Standard deviation)	500–700 m (1,640–2,297 ft) depending on type of RMT Up to 1000 m (3200 ft) depending on type of RMT 1.5 m (5.00 ft) <2 mm (0.007 ft)
Grade Control Operation Shortest tracking range (with 571233035 target)	15 m (49 ft)
Maximum acceleration of target on short distance Radial speed	9°/s ² (10 gon/s)
Maximum velocity of target Radial speed Axial speed	23°/s ² (25 gon/s ²) 6 m/s

Tracker and Radio Performance	Specifications
Radio Type of radio internal/external Radio range Radio data rate Radio output power	Integrated UHF radio in instrument External UHF radio at robotic rod Approx. 1600 m (1 mile) 4800 baud Output 100 – 500 mW (differs from country to country, depending on local legislation)
Tracker Type Active target capability Number of Target ID channels Automatic lock on sighting prism	Eccentric active target tracking system Yes 4 Yes (No search required)
Search Operation Search time (typical) ³ Search area	2–10 s 360° (400 gon) or defined horizontal and vertical search window

Environmental Characteristics	Specifications
Operating temperature	–20 °C to +50 °C (–4 °F to +122 °F)
Dust and water proofing	IPX4

Notes:

- 1 Standard clear: No haze. Overcast or moderate sunlight with very light heat shimmer.
- 2 Range and accuracy depend on atmospheric conditions, size of prisms and background radiation.
- 3 Dependent on selected size of search window

Specifications subject to change without notice.