FUP XTM12 Total Station

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Product Introduction

The FUP XTM Series total station, led by the XTM12 model, is a high-precision surveying instrument engineered for terrain mapping, engineering construction, and building site layout. Combining rugged durability with advanced EDM technology, the XTM12 delivers accurate angle and distance measurements even in harsh environments. Its dual-axis compensator, long-range reflectorless measurement (up to 1000m), and intuitive onboard software boost field efficiency. Designed to resist wear, fatigue, corrosion, and high temperatures, this total station ensures reliable performance on demanding job sites. Whether you need stakeout, traversing, or topographical surveys, the FUP XTM12 provides the accuracy and robustness professionals trust worldwide.

Product Key Selling Points

☑ Extreme Durability for Harsh Environments

The FUP XTM12 features reinforced abrasion resistance, fatigue resistance, corrosion protection, and high-temperature tolerance. It operates flawlessly from -20 ° C to +60 ° C, making it ideal for desert, arctic, or coastal projects. Dust and water rating IP65 ensures sensitive electronics survive job site dust, rain, and humidity. You get a total station that keeps working where others fail.

☑ High-Precision Angle & Distance Measurement

With angle accuracy of 2 ″ (2 seconds) and dual-axis automatic compensation, the XTM12 eliminates setup errors. The EDM module provides prism measurement up to 5000m and reflectorless up to 1000m with ±(2mm+2ppm × D) precision. This means reliable coordinates for high-rise construction, bridge alignment, and tunnel guidance – reducing rework and material waste.

☑ Intuitive Onboard Software & Large Display

The 3.5-inch high-brightness color touchscreen and 20-key backlit keypad allow easy operation in direct sunlight or darkness. Preloaded surveying apps (Coordinate measurement, Stakeout, Resection, Traverse, Road layout) guide even novice operators step by step. Data can be stored internally (50000 points) or exported via USB/Bluetooth. No more complex training – get productive from day one.

☑ Long-Range Reflectorless EDM

Measure inaccessible points safely: cliff faces, overhead cables, building facades, or across busy roads – all without a prism. The XTM12's visible red laser reaches 1000m reflectorless with fine targeting. This accelerates topographical surveys and reduces risk for surveyors. Combined with fast measurement speed (0.8 sec/track mode), you can capture thousands of points per hour.

☑ Smart Connectivity & Data Management

Built-in Bluetooth 4.0 allows wireless connection to Android/iOS field controllers or external GNSS receivers. USB host port supports instant data transfer to flash drives. The FUP XTM12 works seamlessly with popular surveying software (Civil 3D, Surpac, ArcGIS). Cloud-ready through mobile apps – upload field points directly to your office server. Eliminate manual data entry errors and speed up reporting.

Product Specifications

Parameter	Specification
Angle accuracy	2″ (2 seconds, ISO 17123-3)
Angle display resolution	0.1″ / 1″ / 5″ / 10″ selectable
Dual-axis compensator	Liquid-electric detection, ±3′ range, resolution 0.5″
Prism distance range (single prism)	5000 m
Reflectorless distance range	1000 m (Kodak white card 90% reflectivity)
Distance accuracy (prism)	±(2 mm + 2 ppm × D)
Distance accuracy (reflectorless)	±(3 mm + 2 ppm × D)
Measuring time (fine mode)	1.2 seconds
Tracking mode	0.8 seconds
Minimum display unit (distance)	0.1 mm
Laser class	Class 2 (visible red laser, 630-680 nm)
Telescope magnification	30×
Telescope effective aperture	45 mm
Field of view	1° 30′ (2.5 m at 100 m)
Shortest focusing distance	1.5 m
Display	3.5″ LCD color touchscreen, 480×320 pixels
Keypad	20 keys (backlit)
Operating system	RTOS with FUP Survey Suite
Internal memory	50,000 points (expandable via USB)
Data interfaces	USB 2.0 Host, RS-232, Bluetooth 4.0

Battery	Removable Li-ion 7.4V, 4400 mAh
Battery life (single charge)	Up to 12 hours (continuous)
Working temperature range	-20° C to +60° C
Storage temperature	-40° C to +70° C
IP rating	IP65 (dust-tight, protected against water jets)
Dimensions (main unit)	176 mm × 190 mm × 335 mm
Weight (with battery)	5.4 kg
Tripod connection	5/8″ × 11 thread

Product Features

Section 1: Dual-Axis Compensation for Unstable Ground Conditions

When working on soft soil, vibrating bridges, or uneven terrain, traditional total stations suffer from leveling errors that propagate through your survey. The FUP XTM12 integrates a dual-axis liquid-electric tilt sensor that automatically corrects vertical and horizontal angle readings in real time (±3′ working range). This means you can set up quickly with rough leveling – the instrument compensates up to 3 arc-minutes of tilt without field calibration. Surveyors no longer waste time fine-leveling on every station. The result: faster traversing, less fatigue, and consistent millimeter-grade accuracy even when the ground settles during a long measurement session.

Section 2: Long-Range Reflectorless EDM for Hazardous or Inaccessible Targets

Traditional prism-based measurement forces you to physically access points – often dangerous on high slopes, live traffic lanes, or behind fences. The XTM12's Class 2 visible laser reaches 1000 m to any solid surface. Point the crosshair, press measure, and get coordinates instantly. This function is a game-changer for power line sag surveys, road centerline extraction, building facade monitoring, and as-built verification of overhead structures. Clients avoid the cost of scaffolding, traffic control, or working at height. Field crews reduce accident risk and complete topographic surveys 3x faster.

Section 3: Onboard Road & Area Calculation Suite

Civil engineers often struggle with coordinate geometry (COGO) calculations done manually or by transferring raw data to PC. The XTM12 includes preloaded road layout, circular/transition curve calculation, and area computation modules. While still in the field, you can stakeout alignment points, compute cut/fill volumes between two surfaces, or verify right-of-way boundaries. The software shows real-time offset and direction guides on the color display. Mistakes from handwritten notes are eliminated – you leave site with finished, validated data. Contractors can adjust road designs on the fly, saving return trips to the office.

Section 4: High-Speed Tracking for Construction Machine Guidance

During earthmoving, pile driving, or concrete paving, you need real-time position feedback for your equipment – yet traditional robotic total stations can be laggy. The XTM12 features a 0.8-second tracking mode with predictive algorithm that reduces lag to below 100 ms. Combined with a Bluetooth rover prism pole or machine- mounted prism, the instrument continuously updates position data at 5 Hz. Operators see live X/Y/Z deviations on a tablet cab display. This

function solves the pain of inefficient grader passes or excavator overcutting. It reduces fuel waste, ensures design grade on first pass, and speeds up road base compaction.

Section 5: One-Button Data Export & Cloud Sync

Manual data transcription from a total station's internal memory to a USB stick then onto a PC is prone to file corruption and version conflicts. The XTM12 offers USB host, RS-232, and Bluetooth 4.0. With the free FUP FieldLink mobile app, you can pair the instrument to your smartphone, upload measured points directly to Dropbox, Google Drive, or FTP server as GSI/CSV/DXF. Office drafters receive coordinate files within minutes – not hours later. For enterprise users, the XTM12 supports NTRIP for real-time correction streaming via a connected GNSS receiver. Critical data redundancy and real-time backup eliminate the "my field data was erased" nightmare.

Applications & Pain Points Solved

Scenario	Customer Pain Point	How FUP XTM12 Solves It
Large-scale topographic mapping	Surveyors waste days hiking to remote points with reflectors; dense vegetation blocks line of sight.	1000 m reflectorless mode captures ground profiles from a single station; visible red laser points exactly where measured.
High-rise building construction verticality control	Wind and crane vibrations cause unstable readings; rebar layout errors lead to structural rework.	Dual-axis compensator cancels vibrations; 2″ angle accuracy ensures columns and shear walls align perfectly floor by floor.
Road & tunnel engineering	Low light and dust inside tunnels make prism detection difficult; manual stakeout is slow.	Long-range prism mode works in dust; onboard road software guides stakeout with left/right/up/down arrows on backlit display.
Bridge deformation monitoring	Permanent benchmarks are costly to install; manual periodic measurements fail to catch progressive movement.	Set up fixed reflective targets (prisms or tape) and measure from a stable control point over hours/days. XTM12's high repeatability (±2mm) detects mm-level creep.
Utility & pipeline as-built surveys	Pipelines are often buried underground or behind fences; accessing every bend with a prism is impossible.	Reflectorless EDM shoots valve boxes, manhole rims, and pole bases from a safe distance; internal memory stores 50,000 points – enough for 10 km of pipeline.

Q&A

Q1: Does the FUP XTM12 require a prism for all measurements?

No. The XTM12 features a reflectorless EDM that can measure distances up to 1000 m to any solid surface (concrete, wood, painted metal). For ultra- long ranges up to 5000 m or high-

precision control networks, we recommend using a single 62 mm prism to achieve ±(2mm+2ppm) accuracy.

Q2: What file formats can the XTM12 export?
The instrument internally stores points in native FUP format. Through USB or Bluetooth, you can export data as CSV (comma separated), DXF (AutoCAD), GSI (Leica-compatible), TXT, and LandXML. The free FUP Data Manager software converts to any major surveying format.

Q3: Can I use the XTM12 for one-man robotic surveying?
Yes, when paired with the optional FUP RC-5 remote controller and a 360° prism. The total station tracks the prism's movement via servo motors (optional upgraded servo model XTM12S). For the standard XTM12 (manual fine-drive), you can still use one-man operation by placing the instrument in "Guide light" mode – LED arrows on the telescope guide you to the line.

Q4: How do I calibrate the dual-axis compensator?
The XTM12 includes an automatic calibration routine. Set up the instrument on a level tripod, go to "Instrument Settings" → "Compensator Calibration", follow the on-screen prompts (two face measurements). The process takes 90 seconds and should be performed weekly or after rough handling.

Q5: What's the battery runtime in cold weather (below freezing)?
The included 4400 mAh Li-ion battery is cold-optimized. At -10° C, runtime is approximately 8 hours (continuous angle+distance measurement every 5 seconds). At -20° C, runtime drops to 5 hours. We recommend carrying a spare battery (model FUP-BAT44) and keeping batteries in an inner pocket before use. The battery charges within 4 hours using the included AC charger (100-240V universal).

Package Contents

Item	Quantity
FUP XTM12 Total station (main unit with handle)	1
Lithium-ion rechargeable battery (7.4V, 4400 mAh)	2
Battery charger (100- 240V AC, 50/60Hz with EU/US/UK/AU adapters)	1
USB data cable (Type-A to Mini-B, 1.5 m)	1
RS-232 serial cable (DB9 to 5-pin Lemo, 2 m)	1
Plumb bob (250 g brass)	1
Hex key set (1.5mm, 2mm, 2.5mm) for tribrach adjustments	1
Lens cleaning cloth (microfiber)	1
Desiccant bag & silica gel for moisture protection	2
Quick start guide (multi-language: EN, ES, FR, DE, ZH, AR)	1
Calibration certificate (ISO 17123, traceable)	1
Protective carrying case (molded hard plastic, foam interior, IP67 rated)	1

Optional accessories (sold separately): wooden tripod (FUP-TRIPOD), 360° mini prism (FUP-PR360), remote control (FUP-RC5), Bluetooth GNSS rover (FUP-GNSS).