FUP DSA32-1 Automatic Level Machine

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Product Introduction

The FUP DSA32-1 Automatic Level is a high-precision surveying instrument designed for second and third-order national leveling, building construction, deformation monitoring, mining surveying, and large machinery installation. Featuring an advanced automatic compensator, it dramatically improves field efficiency and measurement accuracy by eliminating the need for manual bubble leveling before each reading. With a wide operating temperature range of -30℃ to +50 ℃, this rugged level performs reliably under extreme weather conditions. Its 32x magnification and clear optics ensure sharp target acquisition, making it an essential tool for engineers and surveyors demanding consistent, error-free results across global job sites.

Product Key Selling Points

☑ Reliable Automatic Compensator for Error-Free Readings

The FUP DSA32-1 is equipped with a high-sensitivity magnetic-damped compensator that automatically levels the line of sight within seconds. This eliminates manual levelling errors and speeds up fieldwork significantly. Even if the instrument is slightly tilted, the compensator ensures a horizontal line of sight, providing repeatable accuracy (standard deviation ≤1.0mm per km double-run). Perfect for professionals who need consistent results without wasting time on tedious setup adjustments.

☑ Extreme Temperature Tolerance (-30℃ to +50℃)

Unlike ordinary levels that fail in freezing cold or scorching heat, the DSA32-1 operates flawlessly from -30℃ to +50℃. Its internal compensator and optical components are built with low-expansion materials and sealed against moisture, preventing fogging or jamming. Surveyors working on high-altitude roads, desert construction, or winter pipeline projects can rely on this

instrument for stable performance, reducing downtime due to weather-related equipment failure.

☑ High-Resolution 32x Magnification Optics

Featuring 32x magnification and a 40mm objective lens aperture, the DSA32-1 delivers bright, sharp images with clear resolution even in low-light conditions like dawn or tunnel interiors. The multi-coated lenses reduce glare and chromatic aberration, allowing precise readings on hard-to-see scale divisions. For long-distance leveling or monitoring subtle structural deformations, this optical power minimizes eye strain and reading errors, boosting both productivity and data reliability.

☑ Dual-Purpose Measurement Capabilities (Height, Distance, Angle)

This instrument supports not only height difference measurement but also distance calculation via stadia lines and horizontal angle reading via the 360° graduated circle. Users can quickly determine slope distances, check alignment, or set out angles without switching tools. This versatility saves time and reduces equipment costs for small to medium construction teams. Whether you need rough distance estimation or angular layout for foundation corners, the DSA32-1 handles multiple tasks with one setup.

☑ Rugged, Water-Resistant Construction for Field Use

Built with a sealed, impact-resistant housing, the DSA32-1 withstands dust, rain, and accidental drops (IP54 rated). Rubber armor on the base and focus knobs ensures a secure grip in wet or muddy conditions. The internal compensator is locked during transport by a dedicated locking screw, preventing damage from vibrations. For international contractors and remote site surveyors, this durability means fewer repairs, longer service life, and lower total cost of ownership.

Product Specifications

Parameter	Details
Model	FUP DSA32-1
Type	Automatic (self-leveling) level
Magnification	32x
Objective Aperture	40 mm
Standard deviation per km double-run	≤1.0 mm (with standard invar rod)
Compensator type	Magnetic-damped
Compensator working range	±15′
Compensator setting accuracy	±0.3″
Minimum focus distance	0.8 m
Field of view (at 100m)	2.2 m
Stadia constant	100
Horizontal circle graduation	360° (1° divisions)
Leveling screw type	3-screw, quick leveling
Circular bubble sensitivity	8′/2mm

Operating temperature	-30℃ to +50℃
Storage temperature	-40℃ to +60℃
Ingress protection	IP54 (dust & splash resistant)
Dimensions (instrument head)	145 x 168 x 148 mm
Weight (net, without case)	1.65 kg

Product Features

Section 1: Automatic Compensation for Instant Horizontal Line of Sight

The core function of the FUP DSA32-1 is its magnetic-damped automatic compensator. When the instrument is roughly leveled using the circular bubble, the compensator takes over: a suspended prism system automatically swings into the horizontal position under gravity, damping out oscillations within 2 seconds. This means you never need to perfectly center the tubular bubble (which doesn't exist on this type) – just set the circular bubble, and the line of sight is exactly horizontal. For field surveyors, this solves the painful problem of spending minutes per station to tweak foot screws precisely. On a construction site with dozens of measurement points, the time saved adds up to hours. Moreover, because the compensator eliminates human parallax error from manual bubble centering, the data consistency improves dramatically. Contractors performing slab leveling, foundation height checks, or rail alignment can trust every reading, reducing costly rework caused by inconsistent setups.

Section 2: High-Contrast Optics & Long-Distance Targeting

Equipped with a 32x magnification eyepiece and 40mm objective, the DSA32-1 provides exceptional resolution and brightness. The lenses are fully multi-coated to minimize light loss and ghosting, enabling clear observation of staff graduations even at 100 meters under hazy or twilight conditions. The coarse and fine focusing knobs offer smooth, precise adjustment down to 0.8m minimum focus – useful for checking settlement near the instrument. This optical power directly addresses a common pain point: struggling to read fine leveling rods on sunny days when glare washes out the scale, or during early morning/late evening work when light is dim. Surveyors can extend their working hours and reduce eye fatigue, leading to fewer reading mistakes. In deformation monitoring projects where millimeter-level movements matter, the sharp imagery allows the user to consistently aim at the exact same spot on the rod, improving repeatability.

Section 3: Distance Measurement via Stadia Lines (One-Lens Solution)

Without any extra tools, the FUP DSA32-1 can measure horizontal distances using its reticle's upper and lower stadia lines. Simply read the difference (L in cm) between the two lines on a vertical staff, and that number equals the distance in meters (because the stadia constant is 100). For example, a 32cm stadia interval means 32 meters from instrument to rod. This function solves a major workflow problem: quickly checking approximate distances for slope staking, offset layout, or verifying chainage without pulling out a tape measure or laser rangefinder. For earthwork contractors, being able to verify haul distances or cut/fill lengths on the fly saves carrying extra gear and speeds up decision-making. It also helps when setting up turning points

for leveling loops – you can ensure equal distances between instrument and rods to eliminate residual collimation error, improving overall network accuracy.

Section 4: Horizontal Angle Measurement for Alignment & Layout

The DSA32-1 includes a 360° horizontal circle with 1° graduations, readable from a separate window. To measure an angle, sight the first target using the vertical crosshair, note the angle α; then rotate the telescope to the second target, read angle β; the horizontal angle AOB = α – β. This feature solves a common site problem: quickly checking if walls, pipes, or formwork are square or aligned to a reference line without bringing a theodolite. For small contractors setting out building corners or checking machine foundation axes, this integrated angle capability reduces the need for multiple instruments. Even though it's not a digital theodolite, the ±5′ accuracy is sufficient for most rough alignment tasks. Users save time and equipment rental costs, and can even perform simple traverses or offset stakeout with just one level.

Section 5: Extreme Temperature Resilience & Field Durability

Designed for global use, the FUP DSA32-1 operates flawlessly from -30℃ (Siberian winter pipeline construction) to +50℃ (Middle Eastern summer roadworks). The compensator uses low-temperature grease and magnetic damping that doesn't freeze, while the optics are nitrogen-purged to prevent internal fogging. The sealed IP54 body resists dust and splashing water – crucial for mines, quarries, or coastal projects. A transport locking screw secures the compensator against shock when moving between sites. This durability directly addresses the pain point of instrument failure or drifting accuracy in harsh environments. Contractors no longer need to buy expensive "all-weather" special versions; the DSA32-1 provides reliable service year-round. Field crews report fewer calibration cycles, lower repair costs, and confidence that measurements taken in extreme cold or heat remain valid, reducing project delays due to equipment breakdown.

Applications & Pain Points Solved

Scenario	Customer Pain Point Solved
Highway & railway construction	Ensuring precise roadbed slopes and rail elevation across long distances under varying weather. The DSA32-1's automatic compensator and -30℃ tolerance allow continuous leveling even during early spring frost or summer heat, eliminating downtime.
Building foundation & floor slab leveling	Uneven concrete floors cause costly rework and material waste. With 1.0mm/km precision and quick setup, the DSA32-1 helps contractors achieve perfectly level slabs the first time, reducing grinding or patching.
Deformation monitoring of bridges/dams	Traditional manual levels require frequent calibration and slow readings. The DSA32-1's stable compensator and long-distance optics enable millimeter-level settlement checks over months, providing reliable trend data without instrument drift.
Mining & tunnel surveying	Poor lighting, dust, and tight spaces make reading standard levels difficult. The 32x bright optics and short 0.8m minimum focus allow accurate readings inside tunnels, while IP54 sealing keeps dust out.

Agricultural land leveling & drainage	Uneven fields lead to water pooling or crop yield loss. Using the DSA32-1’s stadia distance and height difference functions, farmers can quickly map topography and design efficient drainage channels with minimal training.

Q&A

Q1: Does the FUP DSA32-1 need batteries or electricity to work?
A: No. The automatic compensator is purely gravity-operated and magnetic-damped, requiring no power. The optical system works entirely without batteries. This makes it ideal for remote sites where charging is unavailable, and it never fails due to dead batteries.

Q2: What is the accuracy of this level for second-order leveling?
A: The DSA32-1 achieves a standard deviation of ≤1.0mm per kilometer double-run (with invar rod). This meets requirements for national second-order leveling and most engineering deformation monitoring. For third-order work, the single-run accuracy (≤1.5mm/km) is also sufficient.

Q3: How do I know when the compensator is working correctly?
A: After roughly leveling the circular bubble, gently tap one of the foot screws – the crosshair should settle back to its original position within 2 seconds without overshoot. If it sticks or drifts, the transport lock may still be engaged (turn screw counterclockwise to unlock). Routine field checks using a “peg test” are recommended every few months.

Q4: Can this instrument be used in rain or high humidity?
A: Yes, the DSA32-1 is rated IP54, meaning it is protected against dust ingress and splashing water from any direction. However, it should not be submerged. After use in rain, wipe dry and store in the provided case with silica gel. The nitrogen-purged optics prevent internal fogging.

Q5: What is included in the standard package?
A: The standard package includes: FUP DSA32-1 automatic level unit, aluminum carrying case, protective lens cap, cleaning cloth, adjustment pin (for calibrating circular bubble), user manual, and warranty card. Optional accessories (tripod, aluminum/wooden leveling rod, invar rod) are sold separately.

Package Contents

Item	Quantity	Description
FUP DSA32-1 Automatic Level	1	Main unit with compensator lock screw, 32x eyepiece, horizontal circle, and foot screws
Heavy-duty aluminum carrying case	1	Foam-lined, water-resistant with padded shoulder strap
Lens cap	1	Snap-on plastic cap for objective lens
Cleaning cloth	1	Microfiber cloth for optics
Hexagonal adjustment pin	1	For circular bubble calibration
User manual	1	

Warranty card	1	2-year limited warranty
Optional accessories (not included)		
Wooden/aluminum tripod, 5m aluminum leveling rod, 3m invar rod, plumb bob		

For bulk orders or technical support, contact your local FUP distributor. The DSA32-1 complies with ISO 17123-1:2010 standards for field testing of surveying instruments.