

ROOTPILOT

SANY GRADE CONTROL ± 0.10 FT ON-GRADE ACCURACY
SYSTEMS ONE DISPLAY MANY MACHINES
MIXED-FLEET COMPATIBLE

SANY



WORK SMARTER, FASTER
ON GRADE

A SYSTEM BUILT FOR EVERY JOBSITE

RootPilot brings precision grade control to the fleet you already own. It installs on virtually any excavator – fixed boom or swing boom, and not just SANY machines – so one platform serves your whole fleet, whether it's uniform or a mixed lineup of brands. It works the way your jobsites already work: alongside existing machine control systems, industry-standard file formats, and the positioning method you already use, from CORS/VRS networks to a local base station. Start with 2D-to-3D, unlock full 3D with a software activation, and scale as your projects grow – without changing how you work.

ANY EXCAVATOR ANY BRAND

RootPilot is compatible with fixed-boom and swing-boom excavators from any manufacturer – and with the attachments that do the work, from standard and tilt buckets to breakers and tiltrotator configurations. SANY America supports the sale, installation, and jobsite deployment of a RootPilot-configured machine regardless of OEM, so one grade control platform covers the whole yard.

ONE DISPLAY MANY MACHINES

RootPilot display is designed to move. Pull it from one machine, mount it in the next, and keep working – machine profiles travel with the system, so there's no recalibration in between. For rental fleets and contractors who shift grade control to wherever the work is, one display can serve many machines.

FLEXIBLE POSITIONING

Choose the positioning strategy that fits your operation: network-based RTK corrections through CORS/VRS, or a local base station available in 900 MHz and 450 MHz configurations. GNSS positioning means the excavator can relocate anywhere on the project without reestablishing control points, maintaining consistent grading accuracy across the entire site, all shift long.

SCALABLE UPGRADE PATH

Start with the 2D-to-3D Standard system and upgrade to full 3D Advanced functionality through a simple software activation – no new hardware, no reinstallation. Your initial investment is protected while capability expands with your workload.

MIXED-FLEET COMPATIBLE

RootPilot doesn't ask you to pick a side. It operates alongside the industry's major grade control platforms, and calibration files keep every machine aligned within ± 0.10 ft of the others on the project. Add it to an active site and it falls in line with the systems already working – no disruption, no ecosystem switch.



± 0.10 ON-GRADE
ACCURACY
FOOT WITH BASE OR
CORS/VRS
CONFIGURATION



*Warranty applies to all 2026 RootPilot products only.



HARDWARE BUILT FOR THE JOBSITE

Four inertial measurement units track the boom, stick, bucket, and machine body – with additional boom IMUs and dual boom-mounted GNSS heads on swing-boom machines – feeding continuous position data through the smart iO box to the in-cab display. Mounted with protective coverings and dedicated plates, the IMUs are engineered for years of impact, vibration, and weather exposure, and they carry 5-year unlimited-hour warranty coverage.

CORRECTIONS YOU CAN TRUST

RootPilot's positioning is built with partners you trust. Corrections come from Point One Navigation's True RTK network – thousands of professionally installed, actively monitored base stations delivering 1-2 cm positioning with 99.9% uptime – or from your own base station in a 900 MHz or 450 MHz configuration. Multi-constellation GNSS tracking across GPS, GLONASS, Galileo, BeiDou, and QZSS keeps the machine locked in, moving freely without ever reestablishing control points.

FILES MADE EASY

RootPilot imports the files your engineers already produce – DXF, LandXML, TTM, VCL, plus .dc, .cal, and .json calibration data – bringing linework, and surfaces models straight into the cab, where operators see grade targets against the design in real time. Working from a different format? Email your file to rootpilot@sanyamerica.com and our engineers will convert it free of charge. Whatever format your project starts in, RootPilot gets it to the machine.

GUIDANCE AT YOUR FINGERTIPS

The in-cab touchscreen is the operator's command center, showing exact bucket position, grade targets, and elevation data in real time against the loaded design. Split views pair a live cut/fill indicator with a full 3D project view; visual and audible indicators guard the grade while the operator keeps full control of the machine. Elevation offsets, layer management, and project switching are all a tap away.

CONNECTED ROOTCLOUD

RootCloud is your fleet's digital management tool. Push design files and calibration data over the air to any connected machine, configure systems remotely, and manage grade control across every project from one screen. New file from the engineer at 6 a.m.? It's in every cab before the operators are – no thumb drives, no drive time.

SOFTWARE FOR EVERY LEVEL OR PROJECT

2D-TO-3D STANDARD

REAL-TIME 3D SPACIAL AWARENESS

Utilizes advanced IMUs and GNSS receivers paired with an in-cab display to deliver continuous, real-time bucket and machine position data in three-dimensional space.

FREEDOM TO MOVE THE MACHINE

GNSS positioning allows the excavator to relocate anywhere on the project without reestablishing control points, maintaining consistent grading accuracy throughout the site.

MAKE 2D FILES INTO 3D PROJECTS

Upload existing 2D design files and generate custom 3D project models directly within the system, maximizing the value of current project data.

SCALABLE UPGRADE PATH

The 2D-to-3D system can be seamlessly upgraded to full 3D functionality through a software activation—protecting the initial investment while expanding capability.

FULL 3D ADVANCED

TRUE 3D GRADE CONTROL

A dedicated in-cab display, deliver real-time bucket and machine positioning in three-dimensional space in relation to uploaded 3D project files.

FULL 3D DESIGN FILE COMPATIBILITY

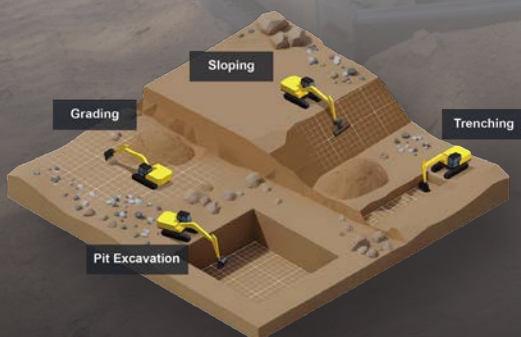
Import 3D linework and surface files containing Northing, Easting, and Elevation data, including detailed linework and surface models—bringing engineered plans directly into the cab.

PRECISION CALIBRATION CONTROLS

Upload calibration files to ensure the system operates within ± 0.10 ft accuracy and remains aligned with other machines running on the same jobsite.

CROSS-PLATFORM COMMUNICATION

Communicates across other major platforms through additional radios or supplemental calibration workflows, ensuring interoperability in mixed-technology environments.



7+ 4PRESET MODEL TEMPLATES FOR
2D-TO-3D STANDARD +3 ADDITIONAL
MODELS AVAILBLE WITH 3D ADVANCED
MODELS

ROOTPILOT

SANY GRADE CONTROL ± 0.10 FT ON-GRADE ACCURACY
SYSTEMS 99.9% RTK NETWORK UPTIME
1,598 GNSS CHANNELS



TECHNICAL SPECIFICATIONS

SYSTEM COMPONENTS MACHINE KIT

Inertial Measurement Units	
IMU - Boom	1
IMU - Stick	1
IMU - Bucket	1
IMU - Chassis	1
IMU - Tilt Bucket (optional)	1 (optional)
GNSS Hardware	
GNSS Heads Fixed Boom	2 Chassis Mounted
GNSS Heads Swing Boom	2 Boom Mounted
GNSS Receiver	1
Smart iO	
Smart iO Control Module	1
Wiring and Mounting	
Harness	Included
Magnetic Mounting	Included
Weld On Mounting	Included
In Cab Display	
Display	1
Storage Case	Included
Software	
2D-to-3D Standard - Fixed Boom	Included
3D Advanced - Fixed Boom	Upgradeable
2D-to-3D Standard - Swing Boom	Included
3D Advanced - Swing Boom	Upgradeable

SYSTEM POSITIONING & ACCURACY

Accuracy	
On-grade Accuracy (Indicate)	± 0.10 ft Typical
Calibrated Positional Accuracy	1-3 cm
Real-Time Kinematics	
Network RTK Positioning	1-3 cm
RTK Precision NTRIP: H	8 mm + 0.5 ppm RMS
RTK Precision NTRIP: V	15 mm + 0.5 ppm RMS
RTK Initialization Time	2-8 s
Initialization Reliability	> 99.99%
Positioning Output Rate	1-20 Hz
Machine Location	
Machine Relocation	CP reestablishment not required
Cross-Machine Alignment	Via uploaded calibration files

REAL-TIME KINEMATICS CORRECTIONS

Network Corrections	
Network Provider	Point One True RTK – single-baseline + Network RTK
Network Uptime	99.9%
Correction Delivery	NTRIP protocol, RTCM messaging
Network Model Support	VRS, FKP, MAC
Local Base Station Corrections	
Local Base Station	900 MHz or 450 MHz
Base Radio Range	3 km (902-928 MHz) / 8 km (410-470 MHz, Farlink)
Trimble Base Station Compatibility	RootPilot Trimble radio kit – serial connection
Topcon Base station Compatibility	RootPilot Topcon radio kit – serial connection
Coordinate Systems	
Standard Factory Systems	2,000+ preloaded industry-standard templates
Calibration	
File Types	.cal, .dc, .json
Guided Site Calibration	RootPilot data collector calibration app

FILE FORMATS & COMPATIBILITY

Design Files	
.DXF	Yes
.LandXML	Yes
.VLC	Yes
.ttm	Supported by SANY America
.tp3	Supported by SANY America
Calibration Files	
.dc	Yes
.cal	Yes
.json	Yes
Jobsite Ecosystems	
RootPilot Base	Yes
RootPilot Network	Yes
Trimble Base	Yes
Trimble Network	Yes
Topcon Base	Yes
Topcon Network	Yes

SANY GRADE CONTROL SYSTEMS ROOTPILOT

SOFTWARE CAPABILITY

CAPABILITY	2D-TO-3D STANDARD	3D ADVACED	ROOTPILOT AUTOMATICS
Real-Time Bucket Position	Yes	Yes	Yes (Coming Soon)
Real-Time Machine Position	Yes	Yes	Yes (Coming Soon)
Free Movement Without CP Reset	Yes	Yes	Yes (Coming Soon)
CORS/VRS Positioning	Yes	Yes	Yes (Coming Soon)
Local Base Positioning	Yes	Yes	Yes (Coming Soon)
Generate 3D Models From 2D Files	Yes	Yes	Yes (Coming Soon)
Generate 3D Models From Field Points	Yes	Yes	Yes (Coming Soon)
Surface Models	No	Yes	Yes (Coming Soon)
Line Models	No	Yes	Yes (Coming Soon)
Template Slope Models	Yes	Yes	Yes (Coming Soon)
Template Trenching Models	Yes	Yes	Yes (Coming Soon)
Template Grading Models	Yes	Yes	Yes (Coming Soon)
Centerline Generation	Yes (20 Point Max)	Yes (∞ Point Max)	Yes (Coming Soon)
Import engineered 3D Surface Files	No	Yes	Software Dependent (Coming Soon)
Import engineered 3D Line Files	No	Yes	Software Dependent (Coming Soon)
Project Calibration File Upload	No	Yes	Software Dependent (Coming Soon)
Cross-platform communication (mixed fleet)	No	Yes	Software Dependent (Coming Soon)
Software Upgrade	Upgrade to 3D Advanced	Upgrade to 3D Automatics	NA
Project Storage	Yes	Yes	Yes (Coming Soon)
RootCloud Management	Yes	Yes	Yes (Coming Soon)
Transferable Dispaly	Yes	Yes	Yes (Coming Soon)
Automatic Hydraulic Stops	No	No	Yes (Coming Soon)
Indicate Only	Yes	Yes	No (Coming Soon)

MACHINE & ATTACHMENT COMPATIBILITY

COMPATIBILITY	2D-TO-3D STANDARD	3D ADVACED	ROOTPILOT AUTOMATICS
Excavator Attachements			
Fixed Boom SANY Excavators	Yes	Yes	Yes (Coming Soon)
Swing Boom SANY Excavators	Yes	Yes	Yes (Coming Soon)
Fixed Boom Excavators	Yes	Yes	No
Swing Boom Excavator	Yes	Yes	No
Standard Buckets	Yes	Yes	Yes (Coming Soon)
Tilt Buckets	Yes (Additional hardware needed)	Yes (Additional hardware needed)	Yes (Coming Soon)
Tiltrotators	Yes (Additional hardware needed)	Yes (Additional hardware needed)	No
Breakers & Hammers	Yes	Yes	Yes
Rockcutters	Yes	Yes	Yes
Backfill Blade	Yes (Coming Soon)	Yes (Coming Soon)	Yes (Coming Soon)
Machine Compatibility			
Fixed Boom Excavators	Yes	Yes	Yes (Coming Soon)
Swing Boom Excavators	Yes	Yes	Yes (Coming Soon)
Motorgraders	Coming Soon	Coming Soon	Coming Soon
Crawler Dozers	Coming Soon	Coming Soon	Coming Soon
Compact Track Loaders	Coming Soon	Coming Soon	Coming Soon
Skidsteer Loaders	Coming Soon	Coming Soon	Coming Soon

In the interest of continual equipment development, SANY America Inc. reserves the right to change these specifications at any time without prior notification.

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SUPPORTING HARDWARE SPECIFICATIONS

DATA COLLECTOR

Operating System	Android 12
Processor / Memory	8-core 2.0 GHz; 4 GB RAM + 64 GB ROM
Display	6.0in sunlight-readable touchscreen, 500 nits, 720×1440
Keypad	Full QWERTY with backlight
GNSS	GPS, GLONASS, BeiDou, Galileo
Connectivity	4G LTE, dual-band Wi-Fi, Bluetooth 5.0, NFC
Camera	13 MP autofocus
Battery	7,700 mAh – up to 20 h
Protection	IP68; 1.5 m shockproof
Operating Temperature	-20 °C to +55 °C
Size	244.5 × 84.5 × 18.5 mm
Weight	409 g

TOTAL STATION

Angle Accuracy	2" – absolute continuous
Distance Accuracy (Prism)	±(2 + 2 ppm × D) mm; 5,000 m range
Distance Accuracy (Non-Prism)	±(3 + 2 ppm × D) mm; 1,000 m range (1,500/2,000 m optional)
Measure speed	Fine 0.3 s / tracking 0.1 s
Compensation	Liquid dual-axis; ±4' range, 1" setting accuracy
Telescope	30× magnification, erect image
Laser Plummet	4-brightness laser point, ±1.5 mm at 1.5 m height
Platform	Android 11, 5.5in color touchscreen, 4 GB RAM / 64 GB ROM
Connectivity	4G, Wi-Fi, Bluetooth 4.0, USB-C, TF card
Battery	Li-ion 7.4 V – 8 h operating time
Protection	IP55
Operating Temperature	-20 °C to +50 °C
Size	350 × 170 × 217 mm
Weight	5.7 kg

EXTERNAL UHF BASE RADIO

450 MHz Frequency Range	410–470 MHz
900 MHz Frequency Range	902–928 MHz
Channels	120 (60 on Farlink)
Modulation	GMSK / 4FSK
Protocols	Trimtalk, Farlink, SOUTH, HUACE*, Hi-Target*, SATEL*, KOLIDA*
Transmit Power	25 W (450MHz) 3 W (900MHz)
Configuration	Front-panel buttons, 3-digit display, or Bluetooth app
Connection	5-pin LEMO (power + I/O), RS232; wireless to Wi-Fi-hotspot bases
Input Power	9–15 V DC
Protection	IP67; 1 m shockproof
Operating Temperature	-30 °C to +60 °C
Size	144 × 174 × 65.9 mm
Weight	1.35 kg
Protocols marked * are software-configured	

ROVER / BASE STATION HEADS

GNSS Channels	1,598, multi-constellation
RTK precision (NTRIP)	H: 8 mm + 0.5 ppm / V: 15 mm + 0.5 ppm RMS
Work Modes	Rover / Base / Static
Internal UHF Radio	2 W transmit/receive; radio router & repeater
450 Mhz Frequency Range	410–470 MHz
900 Mhz Frequency Range	902–928 MHz
450 Mhz Radio Range	8 km
900 Mhz Raio Range	3 km
IMU Tilt Compensation	0–60°, calibration-free, magnetic-interference immune
Battery	7.2 V 6,800 mAh Li-ion – 15 h (rover, Bluetooth mode)
Protection	IP67 (1 m immersion); 2 m pole-drop rated
Operating Temperature	-25 °C to +65 °C
Size	135 × 135 × 83 mm
Weight	907 g

All applicable technology devices are FCC certified.

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SANY + ROOTPILOT



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