NANO Inspector

Rapid Modular and Mobile Deployment Platform

Real-Time 3D Inspection and Live Monitoring

The *NANO* Inspector System is a modular, mobile platform designed to make sonar deployment simple and fast. The Inspector comprises a lightweight mechanical carrier frame supporting the *NANO* IPT rotator and either the Echoscope PIPE *NANO Gen* Series® or an Echoscope PIPE® C500 Surface sonar. The carrier frame can be suspended from a single lifting point or mounted on a tripod to allow placement on the seabed. A single Integrated Sensor Cable (ISC) connects the *NANO* IPT and the C500 sonar to the 3D Connect integrated topside unit for power, control and data. A laptop running 4G USE® software completes the suite providing real-time 3D visualization including directional control of the sonar via the *NANO* IPT rotator.

The *NANO* Inspector System can provide relative positioning and tracking capability for scene awareness and diver 3D point tracking. It can also be used to create relative models of the underwater scene prior to dive operations to facilitate a safe, context-rich environment for the diver. With the optional AHRS unit which attaches to the top of the frame, the *NANO* Inspector can also provide GPS positioning and attitude and heading data. Whether you are working near a structure or in open water, the *NANO* Inspector can be deployed in minutes, enhancing operational efficiency and safety by giving your dive team clear 3D imagery of their work environment, even in zero visibility conditions.

Some of the innovative *NANO Inspector* features available are:

Echoscope PIPE *NANO Gen* Series®
3D imagery available direct to diver and at surface simultaneously, and just a shade bigger than a smartphone

DAVD Compatibility
Can be used with DAVD and DAVD Flex systems to provide sonar data directly to the divers Head-Up-Display (HUD), allowing direct visualization of data

Multiple Deployment Options
Can be deployed in Tripod or Hanging Mode, and with Echoscope PIPE *NANO Gen* Series® or Echoscope PIPE® C500 Surface

Adjustable Angles
Sonar can be mounted forward looking or tilted downward between 0-25° in 5° increments, and tilt allows easier seafloor visualization

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Tripod Deployment	Hanging Deployment
No Nearby Structures (Pier, Wall)	Pier Walls or Pylons Available
Vessel Deployment at Anchor	Vessel Deployment with Live Boating
Level Bottom in Project Area	Shallow Dive Monitoring Operations
Deep Dive Monitoring Operations	Uneven Bottom in Project Area

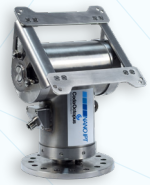
Main Components

Echoscope PIPE NANO Gen Series®

Echoscope PIPE *NANO Gen* Series® is our AI-Ready, Ultra-Compact family of real-time 3D volumetric imaging and perception sonars - purpose built for the next generation of underwater vehicles, diver wearable systems, and robotics platforms. It converts real-time 3D acoustic data into navigational awareness and intelligent system response, delivering exceptional underwater spatial awareness and performance in zero-visibility conditions.

NANO Inspector Tripod

The *NANO* Inspector Tripod features epandable legs for the Inspector Frame, and allows for rapid scanning and target tracking from a fixed location. Utilizing the *NANO* Inspector allows for easy subsea positioning for small ROVs, and accurate monitoring and scene awareness for marine construction or diver activities. The Inspector Frame has an inbuilt lifting eye that allows the whole system to be hung safely.



NANO IPT

The *NANO* IPT provides a rotatable platform for the Sonar, and is fully integrated with the *NANO* Inspector Frame. Coda Octopus 3D Integrated Pan & Tilt products are high performance units designed to meet the demanding and exacting requirements of accurate orientation and position control of the real-time 3D Echoscope PIPE *NANO Gen* Series® sonars, and the Echoscope PIPE® C500 Surface sonars.

AHRS Unit

The AHRS Unit combines an Attitude and Heading Reference System with a small GNSS receiver. It provides attitude and heading information that is used to correctly orient the 3D sonar data, even if the tripod is deployed on an uneven or sloping surface, and the GNSS location is used to position the sonar data correctly in real-world space. No configuration or set-up is required - all offsets are preconfigured within the software, making the task of getting correctly located and oriented 3D point cloud data even easier.

Power Supply (3D Connect or *NANO Gen* Series 3D PSU)

The power supply provides complete integration of Coda Octopus Echoscope PIPE NANO Gen Series® and Echoscope PIPE® C500 Surface, *NANO IPT*, GNSS Correction equipment and Navigation/Attitude sensors, supplying power directly to all of these devices and achieving sonar, rotator and GNSS time synchronization.

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Frame & Tripod Legs (Including AHRS Unit)	
Frame Dimensions (L x W x D)	360mm x 500mm x 260mm approx. (14.17" x 19.68" x 10.23" approx.)
Tripod Legs Dimensions	2080mm x ø30 mm approx. 81.8" x ø1.18" approx.
Weight in Air (With Legs)	11kg approx. (24.25 lbs approx.)
NANO IPT	
Dimensions (L x W x D)	195mm x 230mm x 172mm approx. (7.67" x 9.05" x 6.77" approx.)
Peak Torque	51 Nm
Operational Torque	31 Nm
System Repeatability	±10 arcsec (0.003°)
Absolute Accuracy	±25 arcsec (0.007°)
Speed Typical	up to 20° per second
Angular Range (Pan)	± 99°
Angular Range (Tilt)	0-45°
Control Interface	Ethernet
Time Synchronization	Via 3D Connect 5G, *NANO Gen* Series 3D PSU
Supply Voltage	48 V DC*
Power Consumption (Dynamic)	Up to 2.0A at 48V DC
Power Consumption (Static)	200 mA (at brakehold position) at 48V DC
**Standard Voltage is 48 V DC. 24 V DC input available optionally*	
Weight in Air	11kg (Approx) 24.25 lbs (Approx)
Connector	*Cobalt 6-pin*
Construction	Welded 'T', 316/A4 Marine Grade Stainless Steel
Output Shaft	30mm Diameter, Nitronic 60 Steel, Splined interface with pre-installed interface plate

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/Echoscope PIPE NANO Gen Series	Dual Frquency		Triple Frequency		
Acoustic Projectors	Mid-Frequency (500 kHz)	High-Frequency (840 kHz)	XD Low-Frequency (375 kHz)	Mid-Frequency (500 kHz)	High-Frequency (840 kHz)
Adaptive Frequency Band	420 kHz - 550 kHz	700 kHz - 920 kHz	320 kHz - 400 kHz	420 kHz - 550 kHz	700 kHz - 920 kHz
Number of Beams (Density)	Up to 256 x 256				
Number of Values per Beam	5,500 (Dependent on Features Purchased)				
Maximum Range*	60 m (197 ft)	50 m (164 ft)	120 m (394 ft)	60 m (197 ft)	50 m (164 ft)
Minimum Range*	0.5 m (1.64 ft)				
Range Resolution	2 cm (0.7")				
Update Rate (Ping Rate)	Up to 50 Hz				
Imaging Field of View (User Selectable)	54°x54° – 46°x46°	33°x33° – 23°x23°	90°x45° – 45°x22°	54°x54° – 46°x46°	33°x33° – 23°x23°
Beam Density (Spacing)	0.21° x 0.21° – 0.18° x 0.18°	0.13° x 0.13° – 0.09° x 0.09°	0.35° x 0.18° – 0.18° x 0.09°	0.21° x 0.21° – 0.18° x 0.18°	0.13° x 0.13° – 0.09° x 0.09°
*The actual working range will depend on the target's size, reflectivity and the level of detail required for the Application.					
Dimensions (H x W x D)	218 mm x 182 mm x 149 mm (8.6" x 7.2" x 5.9")				
Weight in Air	4.8 kg (10.6 lbs)				
Power Consumption	2 - 5 A at 24 V DC				
Depth Rating	Rated up to 50m (164 ft)				

NANO Gen Series 3D PSU	
Power Input	100 - 200 VAC Input
Power Output	48 V DC
Data Input/Output	RJ45 Ethernet GB/s Ports for PC 48 V DC and Ethernet to Echoscope PIPE *NANO Gen* Series® BNC PPS TTL Signal Input RS232 DB9 Serial Time Input Connector (ZDA) AC Power In (100 - 240 V AC)
Dimensions (L x W x H)	229 mm x 133 mm x 98 mm (9.02" x 5.24" x 3.54")
Weight in Air	2.2kg (4.85lbs)

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Echoscope PIPE® C500 Surface	Dual Frquency		Triple Frequency		
Acoustic Projectors	Mid-Frequency (375 kHz)	High-Frequency (630 kHz)	*WAVM* (345 kHz)	Mid-Frequency (375 kHz)	High-Frequency (630 kHz)
Adaptive Frequency Band	315 kHz - 425 kHz	550 kHz - 700 kHz	315 kHz - 375 kHz	315 kHz - 425 kHz	550 kHz - 700 kHz
Number of Beams	Up to 256 x 256		Up to 640 x 128	Up to 256 x 256	
Number of Values per Beam	5,500 (Dependent on Features Purchased)				
Maximum Range*	120 m (394 ft)	80 m (262 ft)	120 m (394 ft)	120 m (394 ft)	80 m (262 ft)
Minimum Range*	0.5 m (1.64 ft)				
Range Resolution	3 cm (1.2")				
Update Rate (Ping Rate)	Up to 50 Hz				
Imaging Field of View (User Selectable)	54°x54° – 46°x46°	33°x33° – 25°x25°	25° x Up to 125°	54°x54° – 46°x46°	33°x33° – 25°x25°

*The actual working range will depend on the target's size, reflectivity and the level of detail required for the Application.

Dimensions (H x W x D)	232 mm x 301 mm x 146 mm (9.1" x 11.9" x 5.7")
Weight in Air	9.6 kg (21.2 lbs)
Power Consumption	2 - 4 A at 24 V DC An up to 10 A inrush for less than 20 µs may occur on start-up.

3D Connect 5G	
Power Input	24 - 30 V DC
Power Output	24 - 30 V DC
Data Input/Output	2 RJ45 Ethernet Gb/s Ports 3 DB9 Serial Connectors 1 Aux 12VDC Output 1 DB9 Serial GNSS Corrections I/O 1 BNC PPS TTL Signal Input 1 DB9 Serial Time Input Connector
Dimensions (L x W x H)	278mm x 170 mm x 90 mm (9.02" x 6.69" x 3.54")
Weight in Air	3.0kg (6.61 lbs)

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