MiniUAC-1303

High-Resolution Active-Passive Forward Looking Sonar

Overview

The **MiniUAC-1303A High-Resolution Active & Passive Forward-Looking Sonar** is a high-performance forward-looking sonar designed for demanding underwater perception tasks.
By employing proprietary **beam enhancement technology**, the sonar achieves **high angular and range resolution** while maintaining **long detection range, compact form factor, and low power consumption**. This makes the MiniUAC-1303A particularly well suited for integration into **UUVs, ROVs, and other unmanned underwater platforms**, enabling reliable detection and identification of small targets ahead of the vehicle.

The sonar has a **width of 260 mm**, making it compatible with **medium and small platforms with a diameter of 324 mm or larger**.

The MiniUAC-1303A supports **single-frequency or dual-frequency high-resolution imaging** as standard. According to customer requirements, multiple frequency bands from **200 kHz to 1.2 MHz** and various configuration combinations can be selected to support functions such as **collision avoidance, high-resolution imaging, and low-frequency passive bearing estimation**.
These configurations must be specified at the time of ordering. Some functions can coexist simultaneously.

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Technical Specifications

Specification	A0200	A0200C (Obstacle Avoidance)	A0300	A0400	A0400C (Obstacle Avoidance)	A0700	A0750	A1200
Center Frequency (1)	200 kHz	200 kHz	300 kHz	400 kHz	400 kHz	700 kHz	750 kHz	1.2 MHz
Horizontal Center Beamwidth (2)	< 1.6°	< 1.6°	< 1.2°	< 0.9°	< 0.9°	< 0.55°	< 0.5°	< 0.3°
Horizontal FOV(3)	~ 110°	~ 110°	~ 110°	~ 110°	~ 110°	~ 100°	~ 110°	~ 65°
Vertical FOV(3)	~ 30°	~ 15°	~ 30°	~ 30°	~ 8°	~ 20°	~ 20°	~ 20°
Max Detection Range(4)	> 330 m	> 360 m	> 250 m	> 205 m	> 250 m	> 125 m	> 120 m	> 60 m
Range Resolution(5)	10 mm	10 mm	10 mm	5 mm	5 mm	5 mm	5 mm	5 mm
Refresh Rate	≥ 4 Hz at a working range of 150 m							
Number of Beams	512							
Min Range Resolution	50 mm							
Transmit signal	CW or CHIRP, automatic or manual selection							
Max operating depth	Aluminum housing: 300 m; Titanium housing: 1,000 m							
Max Operating Speed	6 kn (operation above this speed has no impact on functionality but may reduce detection range)							
Blind zone	≤ 0.3 m							
Input Voltage	18–50 VDC (at sonar input; min operating voltage should account for cable voltage drop)							
Power consumption	Average: ~ 30 W; Peak: < 80 W							
Communication interface	1 × Gigabit Ethernet (operable at 100 Mbps for sonar data and control) 1 × synchronization interface (standard differential sync signal)							
External Connector	1 × subsea connector for power, network, and synchronization signals							
Dimensions(W × H × D)	~ 260 (±1) × 68 (±1) × 106 (±3)mm (excluding connector and cable)							
Weight (air / water)	Aluminum housing: ~ 2.5 kg / 1 kg; Titanium housing: ~ 4.5 kg /3 kg							
Housing material	Aluminum alloy (300 m version); Titanium alloy (1 km version)							
Surface treatment	Anodized (300 m version); Natural metal finish (1 km version)							

Notes

(1) Single-frequency or dual-frequency configurations can be specified at the time of ordering. Available dual-frequency combinations include: A0203: 200 kHz / 300 kHz; A0304: 300 kHz / 400 kHz; A0407: 400 kHz / 700 kHz; A0712: 750 kHz / 1.2 MHz; Prices may vary depending on frequency configuration. The maximum detection range of dual-frequency versions may be slightly lower than that of single-frequency versions (approximately 85%–100% of the values listed).

(2) Horizontal −3 dB beamwidth measured at the horizontal and vertical center of a point target.

(3) Field of view (FOV). Large targets within this angle can be detected, but resolution, image clarity, and detection range may decrease toward the edges compared to the center.

(4) Detection range measured in seawater under favorable acoustic conditions against high-reflectivity targets such as embankments and bridge piers. In freshwater under similar conditions, the maximum detection

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range is approximately 1–2× that in seawater. Values apply to single-frequency configurations; dual-frequency configurations may be equal or slightly reduced (approximately 85%–100%).

(5) Theoretical value, defined as the distance represented by a single pixel at close range (typically at a 1 m range).

Passive Bearing Estimation Function (Optional)

- Available for **single-frequency, dual-frequency, or triple-frequency** configurations; switchable via software
- **Center Frequency Range**: 1 kHz – 100 kHz, user-selectable or automatic scanning
- **Detection Range & Bearing Resolution** (example):
  Using a **37.5 kHz beacon with a source level of 175 dB**:
  - Detection range: **2 km**
  - Bearing resolution: **1°**

Built-in Sensors (Design Specifications)

- Outputs real-time **water pressure**
- **Measurement Range**: 0–3 MPa or 0–20 MPa
- **Accuracy**: ±(5% + 10 kPa)

Data Interface & Display Control

Users can control and monitor the sonar through the following methods:

1. **SapphireViewer**, proprietary control and display software supporting **Windows, Linux, and macOS**
2. Direct access to the sonar's **built-in Web server** via IE, Chrome, Firefox, Safari, etc., supporting computers, smartphones, and tablets (note: local data recording and playback are not supported in this mode)
3. Playback via standard **streaming media players**
4. **SDK provided** for custom software development

- **Optionl Internal Storage**:
  Built-in large-capacity storage capable of recording **hundreds of hours of sonar data**

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Overall & Mechanical Dimensions