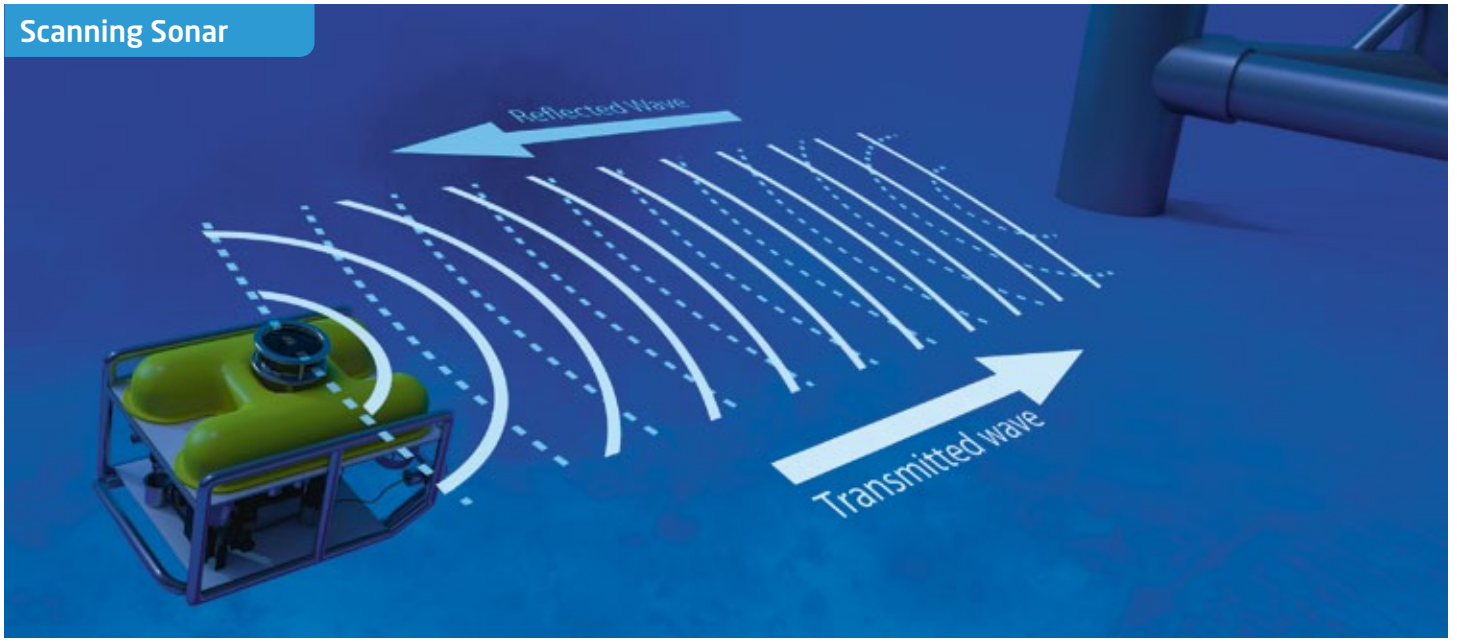
The Sonavision range of scanning sonar's provide unsurpassed acoustic performance and scanning speed as well as being robust, accurate and corrosion resistant. They can operate from moving platforms, such as ROV's or fixed platforms such as seabed tripods.

Sonavision SV series

Scanning Sonar's for Obstacle Avoidance

Scanning Sonar



There are three sonar models in the range, SV1010, SV2020 and SV4040. Each sonar has an acoustic transducer which rotates through a predetermined angle and then transmits a short acoustic burst at a specified frequency. Echoes or reflections are produced by any object in the path of this burst transmission and the time between transmit and receive is used to measure the range to the object. All echoes are plotted on a PPI (plan position indication) display which may be used for navigation, location and sizing of any target within range. The transducer has a predefined "fan" beam pattern with a very narrow horizontal angle providing high angular resolution and a much wider vertical beam angle which minimises the risk of missed targets above or below the central axis, when used for obstacle avoidance.

Sonar on ROV

Common applications for Sonavision sonar units, when ROV or AUV mounted, are obstacle avoidance, navigation and target identification / sizing. The SV range sonars are suitable for use on all sizes vehicles from AUV to large working class ROVs.

Control Unit Display

The sonar's are provided with a Windows compatible control and display software application. The software can be configured to display the sonar data in four different ways dependant on the use of the sonar.
The package provides full control of the sonar characteristics including operating frequency, range, scanning speed, scanning angle and many other useful adjustments. The application runs on Windows PCs as well as embedded versions running on industrial and rack mounted PC's.

WORLD CLASS UNDERWATER TECHNOLOGY

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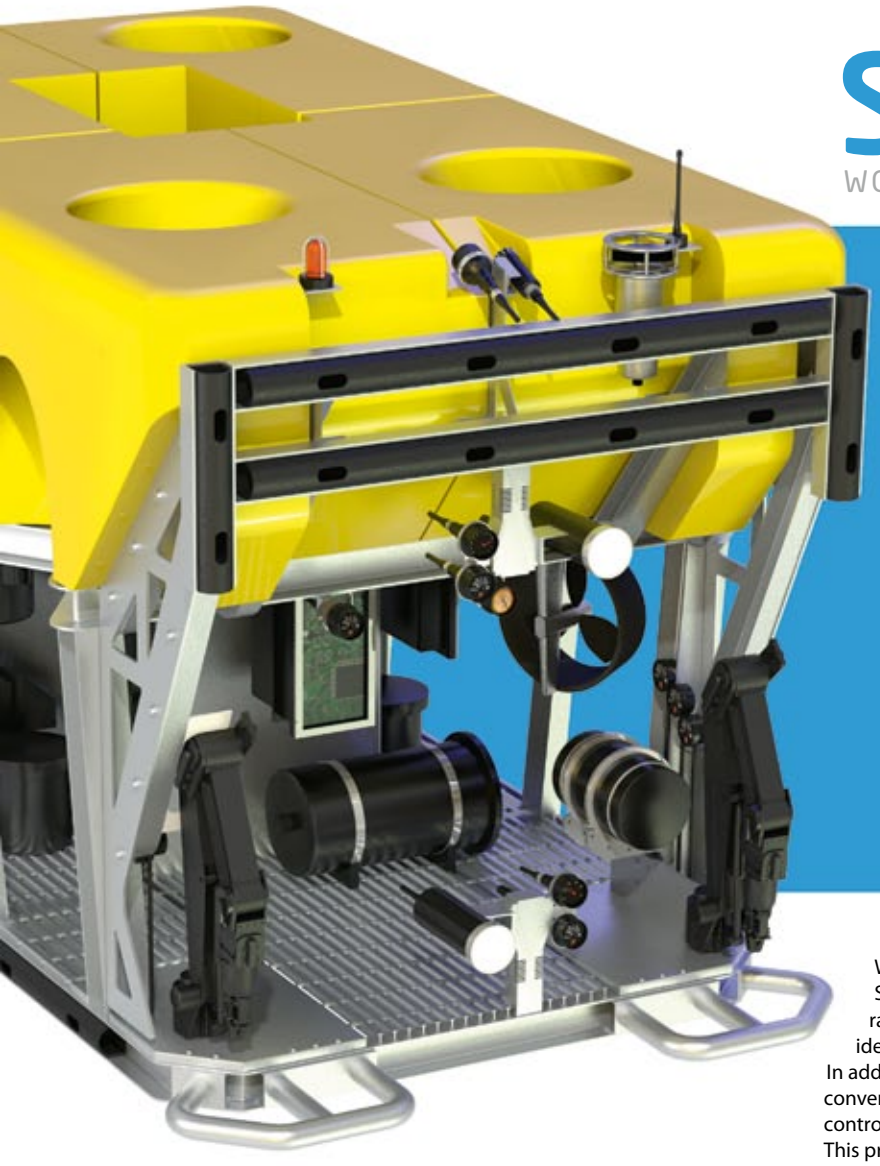


- Compact and robust design
- Frequency range adjustable in 1kHz steps throughout the range
- True acoustic zoom
- 1:3 Composite wideband transducer
- Head guards available
- Various Display Modes PPI, A&B Mode and Sidescan

The SV Range of sonar units have various applications when ROV or AUV mounted. These include: obstacle avoidance, navigation and target identification/sizing. The SV Range includes 3 instruments which cover various operating frequencies to cater for all user requirements.»

The SV1010 provides the highest resolution and smallest size for applications such as mine identification from small vehicles. Though intended for use primarily on small ROV's, with a range up to 100 m, it may also be used on vehicles of all sizes. The SV2020 offers maximum flexibility making it suitable for a wide range of general purpose tasks. It is a real workhorse with its 150 m range and suits all sizes of vehicles including larger vehicles or ploughs. Finally, the SV4040 provides the best range performance possible with high resolution and a range exceeding 400 m; this is intended for larger vehicles, ploughs and, when tripod mounted, for diver monitoring.

Frequency range adjustable for performance optimization

The new SV family represents the latest addition to the Sonavision range of mechanically scanned sonar's. They feature state of the art 1:3 piezo-composite transducers providing extremely wide band operation and high sensitivity. The operating frequency is fully tuneable over the appropriate band providing a unique ability to optimise the performance for range or resolution.

Robust design

The transducers are directly driven from the motor shaft, avoiding the need for a gearbox (which can introduce backlash and inaccurate angular position). The use of micro-stepping motor control allows very small step angles for highest horizontal resolution. The SV4040 uses a transducer in direct contact with water to give highest possible performance. The shaft seal is fitted with a specially designed labyrinth seal to minimise damage due to sand and grit. The SV2020 and the SV4040 feature a titanium construction which eliminates corrosion commonly encountered with aluminium housings.

Easy integration

An industry standard 6 pin connector is fitted but a range of connectors can be supplied to allow easy integration into most existing systems.

Whilst the new SV range is primarily used as an Obstacle Avoidance Sonar, it can be mounted on a variety of different platforms for a wide range of uses. This includes activities such as navigation, target identification, target sizing, diver monitoring and distance measurement. In addition, when mounted inverted on the operating platform, it can be converted into Side Scan Mode (using the built-in option in the surface control and display application) without removing the system from the water. This provides a unique additional benefit to further improve the SV sonar's flexibility in the field. The range of sonar's can be fully configured for RS232, RS485 & RS422 data formats, allowing a full and seamless integration into a variety of platforms, including twisted pair operation and fibre optic multiplexer interfacing. When using twisted pair cable, a communication rate of 115.2kb/s allows operation over more than 1KM of cable.

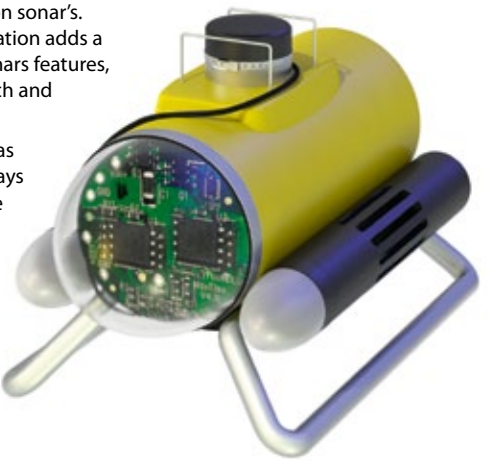
Flexible Control/Display for a wide range of applications

The Sonavision Control / Display Application software is an easy to use yet powerful package for displaying the images generated by the Sonavision sonar range in addition to other survey sensors available from Sonavision. The software package does not require dongle authorisation simplifying its use in the field.

Selection of display mode according to application

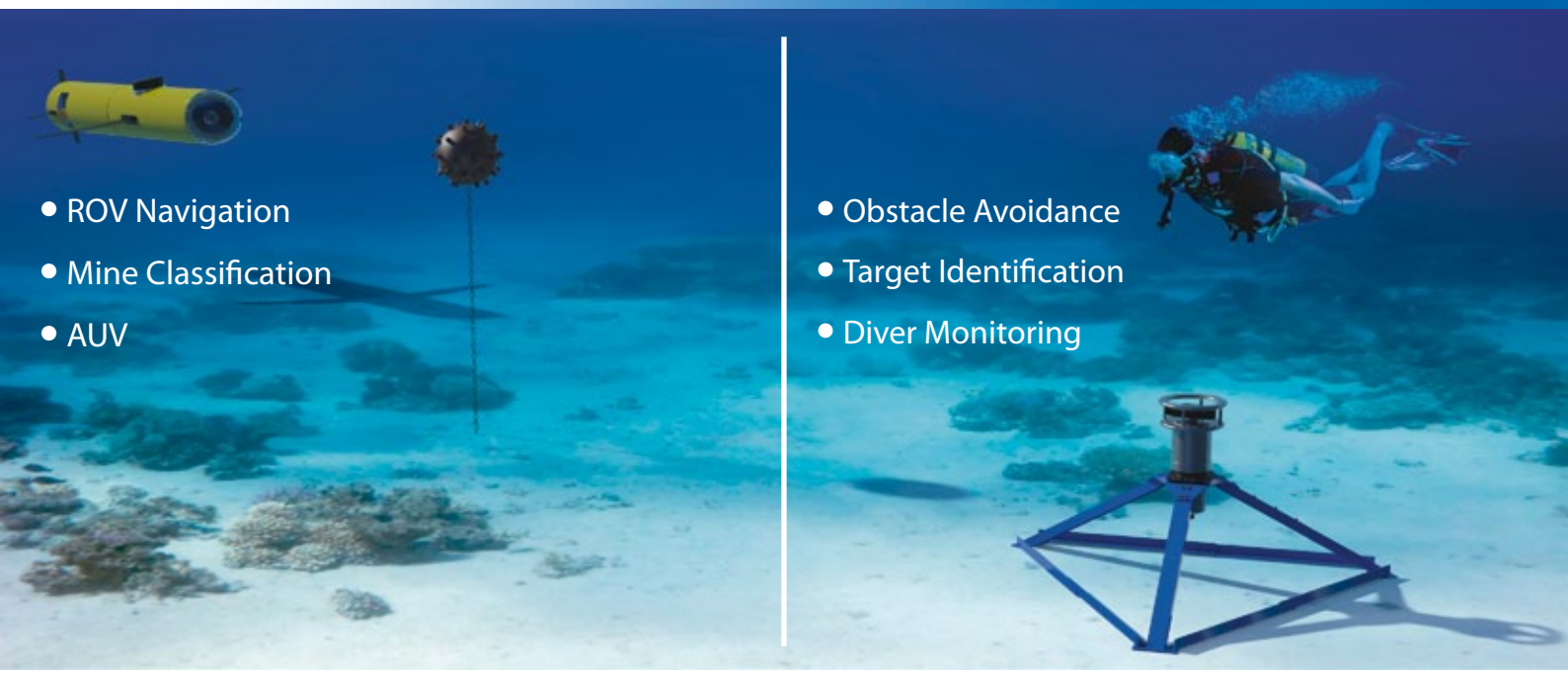
The most common display mode is PPI (Plan Position Indication) which mimics the display conventionally used in radar (sonar is centred on a 360 degree plan view). This mode is used for obstacle avoidance, general navigation and target sizing / acquisition.

- B Scan is variation of the PPI display, particularly favoured by military users.
- The software also has the Side Scan image view which is unique to Sonavision sonar's. This powerful mode of operation adds a further dimension to the sonars features, providing the ability to search and survey large seabed areas.
- Finally, the sonar software has an A scan mode which displays echo amplitudes versus time (i.e. range). This can be used to analyse strength but is also useful as a diagnostic tool. Data can be recorded in any display mode and then replayed in the same or any other mode for post processing.



Applications

A wide range of variety



In general the Sonavision SV range of sonars are used in a wide range of different applications. Due to the compact design and high performance of the Sonavision sonar's have led to several applications for example in the military. These include hand held configurations for divers, mine identification from small ROV's and installation within swimmer delivery vehicles, where the sonar provides real time display of the underwater environment and allows navigation to recognised targets. Rig move/navigation has been aided by the attachment of Sonavision sonar's to each leg of the jack up. This provides near 360° coverage at a range suitable for avoiding obstacles during the manoeuvring of such a structure.

Obstacle Avoidance

Sonavision Sonar's are used today for obstacle avoidance work in a number of situations. Whether it be deep water well intervention through to navigating in the relatively shallow wind turbine installations, all have the common need to avoid costly collisions with unidentified hazards which may be sub surface. The fan beam configuration of the transducers is particularly useful in obstacle avoidance mode since it allows not only obstacles directly ahead of the sonar to be detected but also targets slightly above or below the vehicles centreline.

Target Identification

The Sonavision control / display application software provides many features, including the ability to measure distances from the sonar to targets, between targets and in many situations, the ability to measure the dimensions of the targets.

Fixed installations

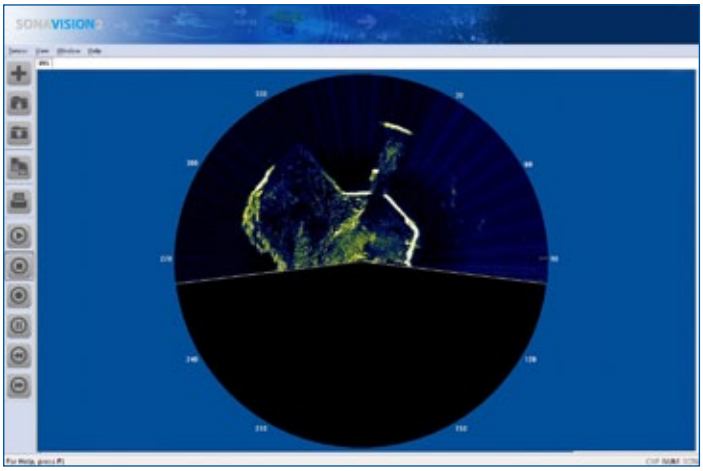
Fixed installations are often used for monitoring underwater activity such as the movements of divers or harbour protection. Such activities usually involve the sonar being mounted on a fixed structure or tripod and, since the sonar is fixed, allow very high resolution images to be acquired of the underwater scene and activities within the field of view. The full 360 degree scanning ability of the sonar's is a distinct advantage not available with multibeam sonar's. Additional tasks also include scour monitoring around the piles and subsea structures of offshore wind turbines allowing for real time update of any potential scour issues.

Mine detection

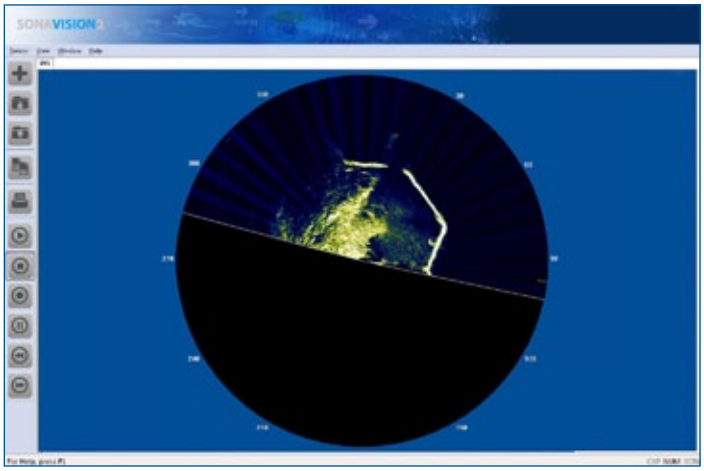
The ability to accurately detect mines and other subsea ordnance is crucial and with the high resolution afforded by the SV sonar range, this is easily catered for. With a growing requirement for state of the art mine detection, the need for a high resolution scanning sonar persists.

AUV

Sonavision sonars are compatible with AUV's. The AUV can be programmed to directly control the sonar thus allowing it to be optimised for the requirements of the current mission. Sonavision can provide details of the communications protocol and messaging information to allow AUV designers to incorporate the sonar into the vehicles operating system, removing the need for the PC based control and display application.



Stonehaven Harbour SV4040



Stonehaven Harbour SV2020

New Generation SV series

Evolution of the proven Sonavision product family

SV1010

The SV1010 is the smallest unit in the family, particularly suitable for small ROV applications where it offers an extremely high resolution performance with good range capability. An oil filled hood protects the transducer and motor drive components. Frequency of operation is user selectable within the range 600kHz to 1200kHz. The SV1010 is also available in a 300m rated acetal housing which provides a reduced weight option for use on smaller vehicles.

- Exceptionally compact size
- High resolution
- Mid to Short Range - 2-100m
- Modular design – simplified maintenance
- Optional depth ratings 300m & 3000m
- Light weight

SV2020

The SV2020 is using the same construction methods as the SV1010, but fitted with a larger, lower frequency transducer. This provides a longer range performance whilst retaining all the advantages of the simplicity of construction and reliability in operation. Frequency of operation is user selectable in the range 325kHz to 675kHz.
The SV2020 provides range capability up to 150m whilst maintaining exceptional resolution and accuracy.

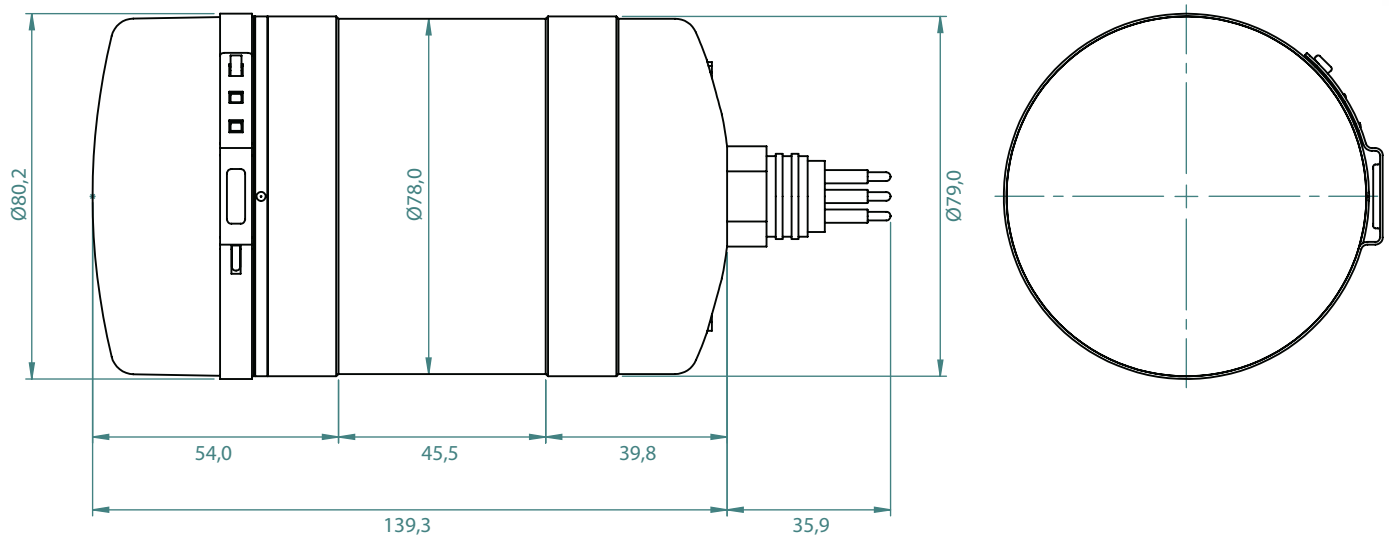
- Compact Size
- High resolution at longest range setting 150m
- Optional Head Guard – Additional protection in tough environments
- Versatile range of uses – Defence to Observation

SV4040

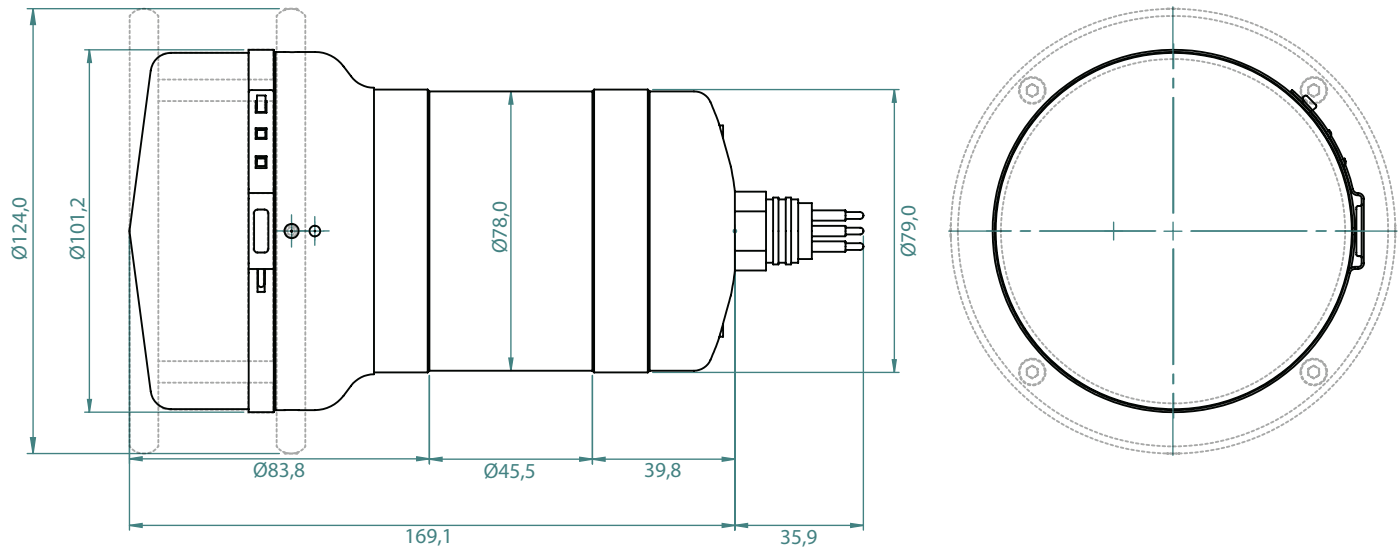
The SV4040 is suitable for larger ROV's, ploughs and stand-alone operation on a tripod. The transducer is in direct in contact with the water in order to provide the highest acoustic performance. The plug-in transducer is field replaceable and has a user chosen operating frequency between 250kHz and 500kHz. State of the art transducer design provides an effective operating range of up to 400m. The motor drive and head preamplifier are installed in an oil filled pressure compensated compartment.

- Compact Size for a sonar of its performance
- Exceptional resolution throughout frequency range
- Long Range – 400m
- Optional Head Guard – Additional protection in tough environments
- Field replaceable transducer – reduces downtime in event of damage

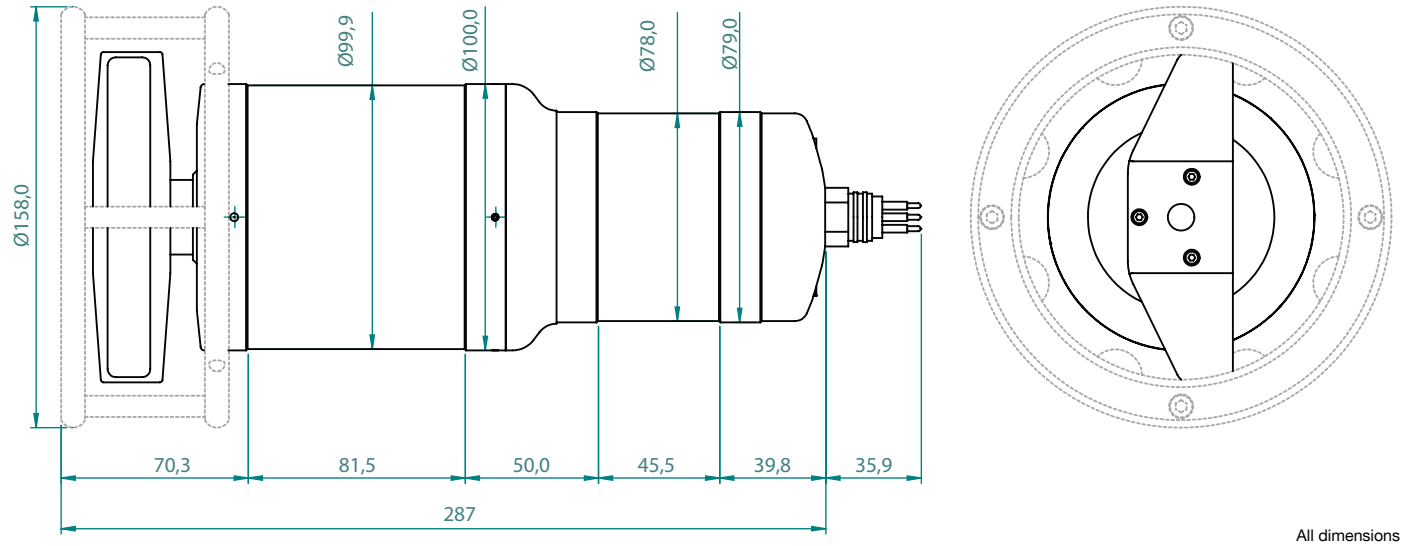
SV1010



SV2020



SV4040



All dimensions in mm.

Technical Specifications

Acoustic Characteristics	UNITS	SV1010		SV2020		SV4040	
		LF	HF	LF	HF	LF	HF
Operating Frequency	kHz	600	1200	325	675	250	500
Horizontal Beam Width	degree.	2	1,0	3,0	1,5	2,7	1,3
Vertical Beam Width	degree.	43	21	39	19	31	15
Transmit Pulse Length	usec.	Optimised to suit selected range - automatic					
Output Power (nominal)	dB re µPa at 1m	205		208		210	
Maximum range	m	100	50	150	100	400	250
Minimum range	m	0,2					
Mechanical Characteristics:		**SV1010**		**SV2020**		**SV4040**	
Depth Rating	m	300 or 3000		3000			
Operating Temperature	°C.	-10 to +35					
Storage Temperature	°C.	-20 to +50					
Weight in Air (300m)	kg	1,2		N/A		N/A	
Weight in Air (3000m)	kg	1,7		1,9		4,8	
Weight in Water (300m)	kg	0,4		N/A		N/A	
Weight in Water (3000m)	kg	0,9		1,0		3,1	
Overall Size	mm	155 long x 79 dia.		182 long x 100 dia.		288 long x 100 dia.	
Transducer Size	mm	N/A				124 wide	
Material - Housing (300m)		Acetal / Ti Gr 2		N/A			
Material - Housing (3000m)		Titanium Grade 2					
Materials - Hood		Polyurethane		PVC		N/A	
Materials - Transducer		uPVC					
Connector		MCBH-6-MPSS					
Electrical Characteristics:		**SV1010**		**SV2020**		**SV4040**	
Power Supply Voltage	vdc			18 to 32			
Power Consumption	W	4,8		9		14	
Communication Option 1		RS232 full duplex - 2 wire + common					
Communication Option 2		RS485 half duplex - 2 wire					
Communication Option 3		RS422 full duplex - 4 wire					
Communication Rate	kbaud	115,2					

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