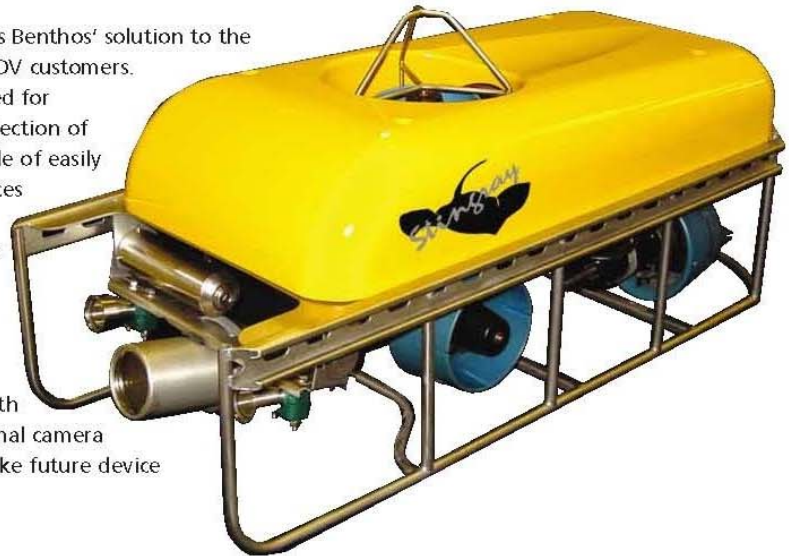


STINGRAY

ROBOTICS

Powerful, Rugged, and Flexible

The *Stingray* Remotely Operated Vehicle is Benthos' solution to the ever-changing needs of inspection class ROV customers. *Stingray* is designed to be easily configured for numerous tasks. In addition to a large selection of tool and device options, *Stingray* is capable of easily interfacing with other user-provided devices via multiple RS-232, RS-485, analog, and digital interfaces. The *Stingray* vehicle has two built-in slide rails, designed for the easy installation of additional buoyancy, tools, cameras, lights, sensors, frames, and/or any other device that the job requires. *Stingray* ROV comes standard with three options connectors and one additional camera connector. These standard connectors make future device upgrades a simple operation.



Easy Deployment

Stingray is truly a one-man deployable inspection class ROV. With an in-air weight of 70 lbs (31.75 kg), it can easily be deployed and recovered by one person from any stable platform.



APPLICATIONS

- ▶ Mine countermeasures
- ▶ In-situ biological studies and sampling
- ▶ Port and harbor security tasks
- ▶ Ship hull inspections
- ▶ Dam and tunnel inspections
- ▶ Under-ice surveys and operations
- ▶ Interior and external pipe inspection
- ▶ Inspection of nuclear reactor facilities
- ▶ Salvage operations
- ▶ Offshore structure surveys
- ▶ Inspection of water tanks and systems
- ▶ Inspection of sewer systems
- ▶ Search and rescue (SAR) operations
- ▶ Police evidence search and recovery operations
- ▶ Real-time monitoring of marine construction operations
- ▶ Artificial reef monitoring operations



SPECIFICATIONS

PERFORMANCE

Maneuverability:	3-axis translation and yaw rotation
Horizontal speed:	Greater than 3 knots on surface with a short tether deployed, depending on payload
Vertical speed:	0.75-1 knot up or down
Lateral speed:	0.75-1 knot left or right
Operating depth:	350 m (1150 ft) of seawater
Stability:	Gravity stabilized in roll and pitch to maintain ± 5 degrees maximum inclination
Payload:	2.5 kg (5.5 lb) in-water weight with removal of all ballast; additional buoyancy modules are available for an almost unlimited payload capability

PHYSICAL CHARACTERISTICS

Size:	46 cm (18.0 in.) high 46 cm (18.0 in.) wide 99 cm (39.0 in.) long
Weight:	32 kg (70 lb), for standard 2-horizontal thruster configuration, excluding ballast and installed options
Slide Rails:	Two built-in slide rails for easy installation of additional tools, sensors, thrusters, cameras, lights, etc., these rails run the entire length of each side of the <i>Stingray</i> ROV

THRUSTERS

Horizontal:	Two 1/2-hp magnetically coupled brushless DC motors; four optional
Vertical:	One 1/2-hp magnetically coupled brushless DC motor
Lateral:	One 1/2-hp magnetically coupled brushless DC motor
Forward static thrust:	10.4 kg (23 lb), per thruster
Reverse static thrust:	5.9 kg (13 lb), per thruster
Propeller:	Nylon
Nozzle:	Nylon Kort

VIEWING SYSTEM

Camera:	High-resolution 12X zoom color video, NTSC or PAL; up to 2 additional cameras optional
Lens:	3.24–38.9 mm (12:1 zoom), f1.8–2.7 with auto iris
Focus:	Remote, macro to infinity
Horizontal field of view:	2.2–53 degrees in water
Resolution:	460 lines
Sensitivity:	1 lux @ 50 IRE
Lights:	Two 150-watt quartz halogen, variable intensity, mounted to tilt bar so that they track with the camera; two additional lights optional
Tilt mechanism:	90 degrees up from horizontal, 90 degrees down from horizontal, built-in slip clutch, User definable Tilt Home feature, holds up to 3 cameras and 4 lights at one-time: pan and tilt mechanism optional
Tilt rate:	10 degrees/sec

SENSORS

Pitch/roll:	$\pm 20^\circ$, $\pm 0.2^\circ$ with 0.2° resolution
Heading:	0–360°, $\pm 1^\circ$ with 1° resolution
Depth:	$\pm 1\%$ of operating depth
Angular rate sensor:	Yaw rate gyroscope, $\pm 150^\circ$ /sec

SURFACE CONTROL UNIT AND VEHICLE POWER SUPPLY

Physical Characteristics

Size:	37.1 cm (14.6 in.) high 56.2 cm (22.1 in.) wide 56.0 cm (22.0 in.) long
Weight:	15 kg (33 lb)

Electrical Specifications

Input power requirements:	100–120 VAC or 200–240 VAC, 47–63 Hz, single phase, 2500 W, 5000 VA maximum, depending on installed options. Adjustable current limiting for use with small generators.
Output power to vehicle:	150–300 VDC at 8 Amps, isolated, regulated at vehicle

Controls and Indicators

Front panel displays:	Hours Power supply voltage Power supply current
Front panel indicators:	Vehicle power 12 VDC power Over temperature alarm Ground fault alarm Water leak alarm Sensor fault alarm Communications loss alarm Audio alarm Power supply constant voltage mode Power supply constant current mode Power supply overvoltage shutdown Power supply standby Power supply over temperature Power supply AC fault Front panel controls: System power switch Ground fault bypass switch Alarm silence switch Graphics overlay switch Power supply on/off switches Power supply current control Power supply overvoltage set control Power supply overvoltage preset switch Power supply voltage/current limit switch Front panel fuses: AC (2) 12 VDC
Video overlay displays:	Depth, digital with analog bar graph Heading, digital with compass rose Altitude, digital with bar graph (optional)

SPECIFICATIONS *continued*

	Tilt, digital (pan/tilt with optional pan and tilt)
	Pitch and roll, digital
	Date in month, day and year
	Time in hours and seconds
	Cable turns, up to 99 turns
	Optional displays, digital with 0-5 volt inputs
Input/output connections:	Keyboard (factory or advanced users only)
	Ethernet (factory or advanced users only)
	CRT (factory or advanced users only)
	GPS (available for future use)
	Three RS-232 (available for future use)
	Video out A and B
	Handbox
	Tether
	Sonar
	Power supply
	AC in from power supply
	AC out (for video display and recorder system)
	Power supply AC in

HANDBOX

The Handbox connects to the Surface Control Unit with the Handbox extension cable and is used to control all of the *Stingray's* functions. It is packaged in a rugged, cast aluminum housing with drop protectors and includes a comfortable padded neck strap.



▲ *Stingray topside control console and hand control box.*

Physical Characteristics

Size:	14.0 cm (5.5 in.) high
	22.2 cm (8.8 in.) wide
	15.9 cm (6.3 in.) long
Weight:	1.7 kg (3.7 lb)
Extension cable length:	15.2 m (50 ft)

Controls and Indicators

Indicators:	Vehicle power
	GFI alarm
	Leak alarm
	Temperature alarm
	Auto heading
	Auto depth/altitude

Controls:	Horizontal joystick (3-axis)
	Vertical joystick (1-axis)
	Vertical trim control
	Range trim control
	Vehicle power switch
	Tilt down/up switch
	Tilt return home button
	Pan right/left switch (w/optional pan and tilt)
	Camera select A/B switch (used w/optional 2nd or 3rd camera)
	Film trigger button (used w/optional film or digital still camera)
	Zoom in/out switch
	Focus auto/manual
	Focus near/far switch
	Lights switch
	Lights brightness switch
	Thruster null button
	Depth/altitude select switch
	Auto heading button
	Auto depth/altitude button
	Aux 1 switch
	Aux 2 switch
	Manipulator arm in/out switch (used w/optional manipulator)
	Manipulator wrist cw/cww switch (used w/optional manipulator)
	Manipulator jaw open/close switch (used w/optional manipulator)

TETHER

Length:	100 m (328 ft) standard
Diameter:	1.65 cm (0.65 in.)
Weight in fresh water:	Neutral
Weight in air:	65 kg/305 m (143 lb/1000 ft) nominal
Breaking strength:	900 kg (2000 lb) nominal
Peak tension load:	164 kg (360 lb) maximum
Minimum bend radius:	20 cm (8 in.)
Construction:	Outer yellow foam polyurethane flotation jacket over Kevlar braid
Conductors:	(2) 75-ohm coax, (4) 18 AWG, and (2) 26 AWG twisted shielded pair



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