

Programmable Wireless Charging and Uptime Optimization for Aquatic Robots

Autonomous Power Management



Maximize Vehicle Operations

Wireless charging-enabled docking stations can be placed in aquatic environments allowing AUVs to dock and charge quickly at any station.



Enhance Power Accessibility

Wireless charging components can be optionally potted to allow full aquatic submersion. Flexible antenna range keeps the system running despite biofouling.



Monitor and Control Remotely

WiBotic's technology enables fleet-wide power management eliminating the need for constant human monitoring and management of battery charging.

Our Solutions

Autonomous Underwater Vehicles (AUVs) serve many different roles, from surveillance to mapping, inspection, and search/recovery. AUVs can dive to extreme depths and operate unattended for days, but unfortunately mission time is often limited. Eventually they must return to the surface for fresh batteries or recharging.

Several attempts have been made at underwater charging, but contact-based systems proved complex and unreliable. Induction-based wireless systems, while initially promising, required high precision docking that was often compromised by biofouling. There simply didn't appear to be a reliable means for transmitting power underwater – until now.

WiBotic's wireless charging and uptime optimization solutions solve these problems with components that provide both high power levels and a high degree of positional flexibility – allowing AUVs to charge simply by swimming into or near underwater transmitting stations. When located strategically, groups of transmitters allow entire fleets or swarms of AUVs to stay on station for research and defense applications.

How WiBotic Wireless Power Solutions Work



*Charge parameters can be reconfigured in software after initial setup. Battery not included.

Available Components For Your Specific Application Needs

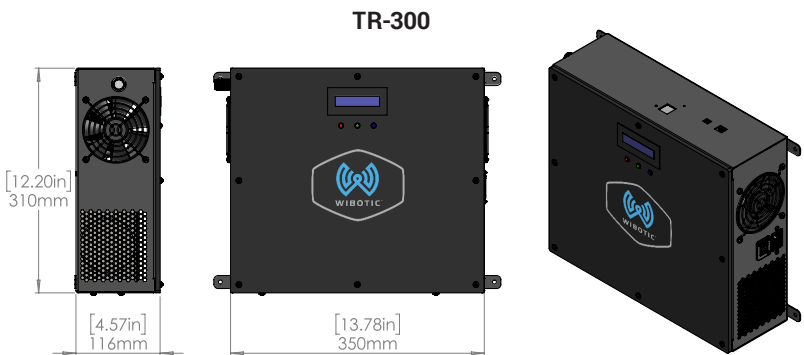
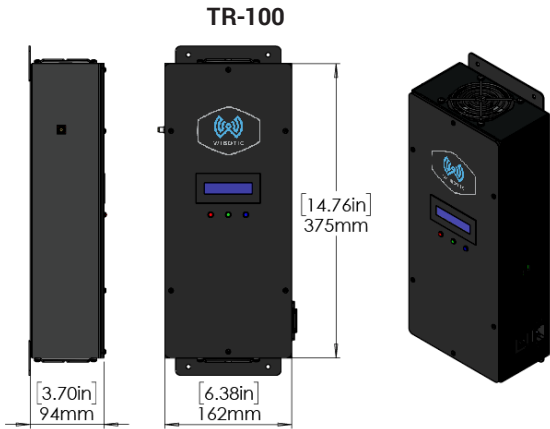
WiBotic offers a range of wireless charging components to accommodate nearly any aquatic robot system. Designed for “many-to-many” operation, it allows multiple transmitters to autonomously recharge multiple robots. Robot battery voltage and charge rate is configurable in software, so robots with different battery chemistries and voltages can share the same set of transmitters.

TRANSMITTER UNITS

WiBotic transmitters (TRs) convert AC power to a high frequency wireless power signal for transmission to the robot fleet. (DC powered models also available).

TRANSMITTER UNIT (in enclosure)	TR-100	TR-300
Input Voltage (AC)	90-264v	90-264v
Input Receptacle (AC)	IEC320-C14	IEC320-C14
Input Frequency	43-63 Hz	43-63 Hz
Enclosure Type	ABS Plastic/Metal	ABS Plastic/Metal
Data Port	Ethernet	Ethernet

*DC powered configurations available

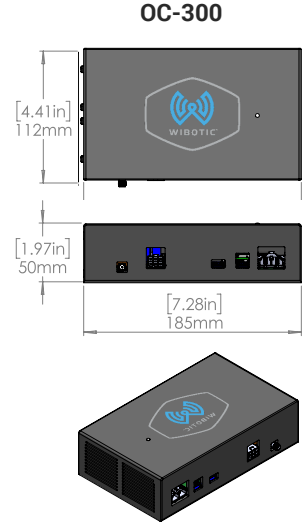
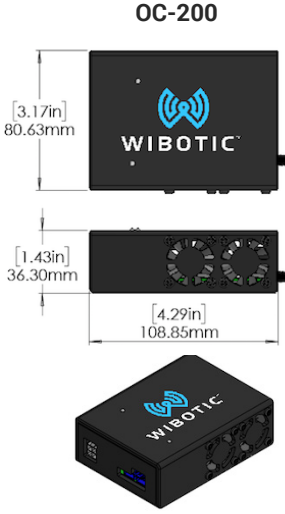
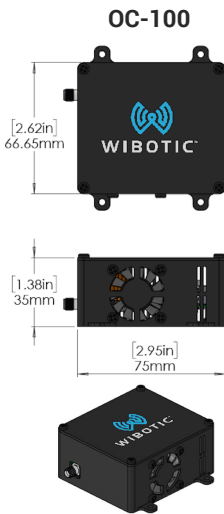


ONBOARD CHARGERS

Onboard Chargers (OC's) are receiver circuit boards that convert incoming wireless power to a usable DC voltage. They're also smart battery chargers, with the ability to safely charge a wide range at batteries types at adjustable charge rates.

ONBOARD CHARGERS	OC-100	OC-200	OC-300
Battery Compatibility	LiPO, Lilon, SLA LiFePO4,NMH	LiPO, Lilon, SLA LiFePO4,NMH	LiPO, Lilon, SLA LiFePO4,NMH
Battery Voltage Range	11.2-58.4v DC	11.2-58.4v DC	11.2-58.4v DC
Max Charging Current	5A*	10A*	30A*
Max Charging Power	100w*	250w*	>300w*
Weight (PCB & Fan)	46g	82g	220g
Total Weight (w/enclosure)	74g	154g	413g
Operating Temperature	-20 to 40C	-20 to 40C	-20 to 40C
Transmitter/Receiver Communication	2.4 GHz Wireless	2.4 GHz Wireless	2.4 GHz Wireless
Aux Wired Charging Input Voltage	12-48v DC	12-48v DC	12-48v DC

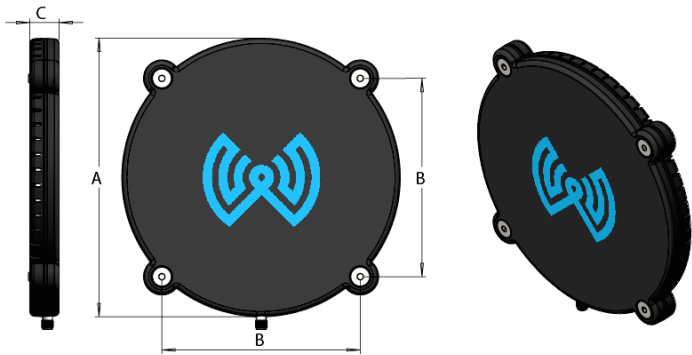
*Must be paired with properly sized transmitter to achieve max value



TRANSMITTER AND RECEIVER COILS

Transmitter (Tx) and receiver (Rx) coils are specialized antennas that transmit and receive wireless power at specific frequencies. The standard WiBotic coil set is shown, but custom coil configurations, offered through our Integration Services, are also available.

TRANSMITTER/RECEIVER COILS (in enclosure)	RX-100	TX-200
Total Width (A)	104.5	205.5
Mounting Hole Distance - Max (B)	85	145
Thickness (C)	7.6 [0.30]	15.5 [0.61]
Enclosed Coil Diameter	100	200
Total Weight (w/enclosure)	35g	180g

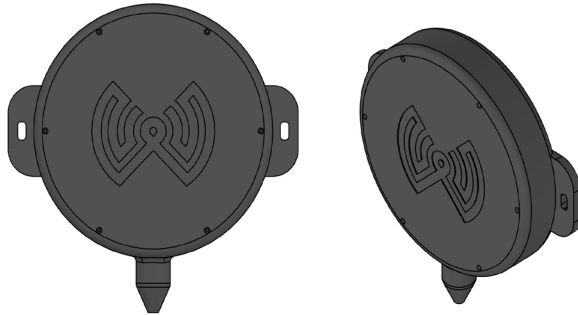


WiBotic's API allows robot scheduling systems to optimize charge rate (amps) for every charge cycle. The result is not only maximum uptime for entire robot fleets, but superior management of battery health and longevity for reduced operating costs and preventative maintenance.

OPTIONAL COMPONENTS

WiBotic's standard configurations can be mixed and matched to build the system that best suits your needs. However, if you're interested in ready-to-deploy simplicity, our optional embodiments may be of interest.

THE WIBOTIC WET: The WiBotic Wet components are specifically tuned and optimized to operate in harsh marine conditions and can be fully submerged. Antenna coil designs can be planar or cylindrical, allowing AUVs to swim into one end of the transmitting antenna for a charge, and then out the other side to resume the mission. Contact us to discuss customization options.



BATTERY INTELLIGENCE MODULE: Many AUVs use new “smart batteries” with onboard balancing and BMS systems. Unless you're a master programmer, though, you probably haven't taken advantage of their advanced features. And there are still many AUVs that use traditional batteries without battery intelligence on their own. WiBotic's BIM solves these problems. Providing Cell Balancing, Monitoring and Protection, the BIM provides complete battery management and a host of reporting capabilities to help minimize long term battery costs.

Industries We Serve



Mapping



Research



Inspection



Defense

How To Get Started

WiBotic wireless charging and software enabled uptime optimization solutions are extremely flexible across a wide range of applications and power levels. However, every aquatic robot application is unique. To ensure the best possible experience with WiBotic hardware and software, we provide an upfront evaluation and integration service that is customized to meet your needs. Depending upon the design of your aquatic robot, the service may include:

- Analysis and testing of component positioning
- Final performance verification testing
- Installation support of a standard set of components
- Customization of component sizes and shapes

Contact Us To Learn More

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