



MBARI FOCE

Ocean Acidification Research Tool

The MBARI FOCE (Free Ocean Carbon Experiment) is technology for studying the effects of ocean acidification. FOCE takes the experimental concept of the terrestrial Free Air Carbon Experiments into the ocean, making it possible to perform *in situ* experiments in a pH-controlled environment.

FOCE may be implemented for shallow water or deep, and the flexible design provides many options for optimizing cost and performance.

Features

- Maintain pH offset relative to reference sensor
- Maintain specified constant pH
- Manual or small-boat deployable
- Diver serviceable
- Real-time telemetry and system monitoring
- Automatic data logging
- Wide range of operating depths
- Scalable, customizable architecture

Specifications

	Min	Max	Typical
pH operating range	7.0	8.0	
pH tracking			±0.01
pH resolution			±0.001
Instrument suite			CTD (2) pH (2) DO (2) Water flow (2) Video Camera (1)
Data storage			128 GB
Sample rates		2 Hz	
Device inputs			16x RS-232 10/100Base-T Ethernet
Supply Voltage			12, 24, 48, 400 VDC

	BASIC	BETTER	BEST
Self-contained	○	○	○
CTD	2	2	2
DO	2	2	2
pH	2	4	4
Velocity/Flow	2	3	3
ESW Pump	1	1	1
ESW Diverter	1	1	2
Thrusters	1	1	2
Light Panel	1	2	3
Timelapse Cam	✓	○	○
Video Cam	✗	2	3
Bidirectional Flow	✗	✓	✓

✓	Included
✗	Not Included
○	Optional

OPTIONS	
Energy Source	Diesel/Gas/etc. Wind/Solar Shore Utility Batteries
Power Generation	Wind Turbine PV Panels Diesel Generator Shore Utility Air Compressor HPU
Power Distribution	Cabled Self-contained
Power Storage	Batteries
CO ₂ Source	Bottled Gas Diesel Gen
ESW Storage	Shore ESW Reservoir In-situ ESW Reservoir In-situ liquid CO ₂ Reservoir
ESW Distribution	Electric Pump Hydraulic Pump Pneumatic Pump
Telemetry PHY	RF Cell Satellite Cable Inductive
Telemetry Protocols	TCP/IP Serial 802.11 SBD
Com PHY	Inductive Twisted pair Coax Fiber-optic Acoustic
Com Protocols	TCP/IP RS422 RS232 CAN RS485