

# Carousel Auto Fire Module

# AFM



## SUMMARY

- Allows SBE 32 Carousel Water Sampler to operate autonomously on non-conducting cable, firing bottles at pre-programmed pressures or elapsed times
- Internal batteries (60 hours operation with alkaline batteries), internal memory (for bottle data)
- Depths to 6800 meters

## DESCRIPTION

The Carousel Auto-Fire Module (AFM) allows the Carousel Water Sampler (SBE 32, 32C, or 32SC) to operate autonomously on non-conducting cables. The AFM includes a microprocessor, solid-state memory, RS-232 interface, and battery power that supply the operating voltage, logic, and control commands to operate the Carousel.

**When used without a CTD**, the AFM fires bottles at pre-defined elapsed times after receipt of the *Arm* command. The depth at which samples are taken can be determined (approximately) by monitoring cable length pay out and elapsed time. The AFM records bottle number, date and time, and fire confirmation for each bottle fired. At the end of a cast, the bottle data (.afm) file is uploaded from the AFM.

**When used with a CTD** (SBE 19, 19*plus*, or 19*plus* V2 Seacat, or SBE 25 or 25*plus* Sealogger) or **SBE 50 Pressure Sensor**, the AFM:

- Monitors the pressure data recorded by the CTD (or transmitted by the SBE 50) in real-time,
- Fires bottles at pre-defined pressures (depths), on upcast, downcast, or when the Carousel is stationary for a specified period of time, and
- Records bottle number, date and time, firing confirmation, and five scans of CTD or SBE 50 data in AFM memory for each bottle fired.

Setup and data upload are performed (without opening the housing) with our SeatermAF terminal program. At the end of a cast, CTD data is uploaded from the CTD (through the AFM) and bottle data is uploaded from the AFM. SBE Data Processing's Data Conversion module converts the raw CTD data and creates a .cnv CTD data file and .ros bottle data file.

Firmware upgrades can be downloaded through the communications port by the user, without opening the housing.

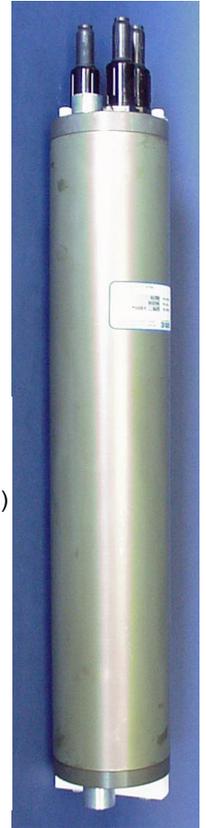
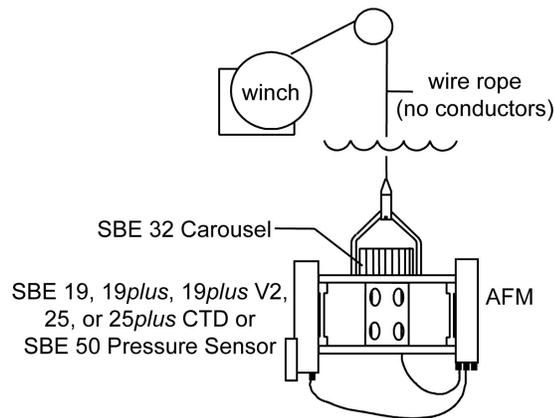
The AFM has an anodized aluminum housing rated to 6800 meters (22,300 feet). Bulkhead connectors for the CTD, Carousel, and Data I/O (RS-232) are mounted on the housing end cap. The AFM is typically installed on the Carousel, with the same mounting bracket used to mount a Seacat, and hangs vertically between the upper and lower adapter plates.

The AFM is powered by 9 alkaline D-size cells, which provide approximately 60 hours of operation. Optionally, the AFM can be powered by rechargeable NiMH batteries. Battery endurance is predominantly a function of the amount of time the AFM is powered and armed; the number of bottles fired has little impact.

## SOFTWARE

The AFM is supplied with a powerful Windows 2000/XP software package, Seasoft® V2, which includes:

- **SeatermAF** — terminal program for easy communication and data retrieval.
- **SBE Data Processing** — modules for calculation, display, and plotting of temperature, conductivity, pressure, auxiliary sensor data, and derived variables such as salinity and sound velocity.

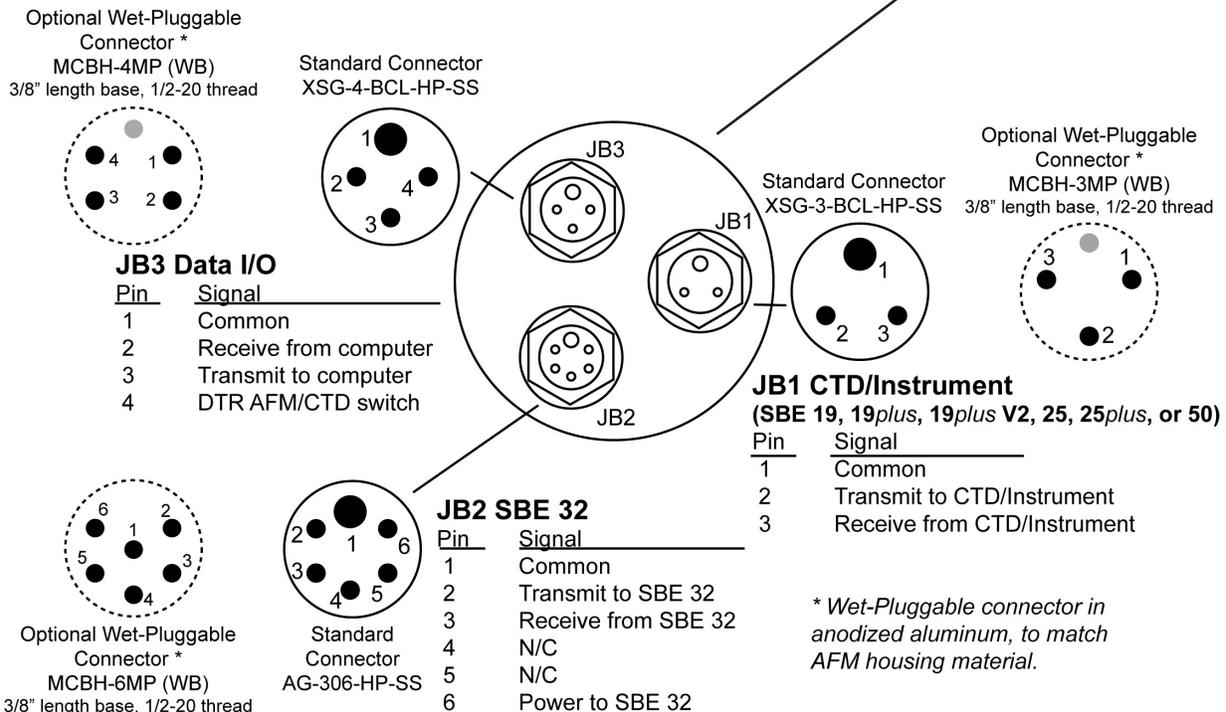
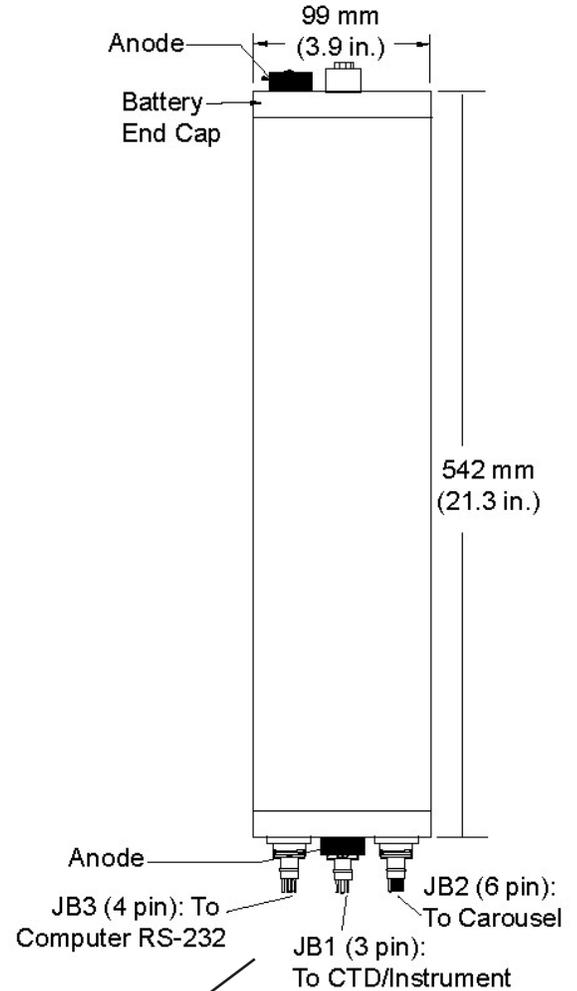


# Carousel Auto Fire Module (AFM)



## SPECIFICATIONS

- Memory** 64K byte static RAM memory
- Data Storage** Memory space for 1 cast (24 bottles maximum).  
AFM memory records for each bottle fired:  
(if used with a CTD) Bottle sequence and number, date and time, firing confirmation, battery voltage, scan number of first of 5 CTD scans, and 5 scans of CTD data  
(if used without a CTD) Bottle sequence and number, date and time, firing confirmation, and battery voltage
- Real-Time Clock** 32,768 Hz TCXO accurate to  $\pm 1$  minute/year
- Internal Batteries**  
Standard: 9 alkaline D-size batteries (Duracell MN1300, LR20); approximately 60 hours of operation  
Optional: Rechargeable 9-cell NiMH battery pack; approximately 45 hours of operation
- Current**  
Quiescent Current: 30 microAmps  
Operating Current: Not armed - 3 milliAmps  
Armed, Carousel capacitor charged - 160 milliAmps  
Armed, Carousel capacitor charging - 300 milliAmps
- Materials** Anodized aluminum housing rated at 6800 meters (22,300 feet), with zinc anode protection
- Weight**  
In air: 8.1 kg (18 lbs)  
In water: 4.1 kg (9 lbs)



\* Wet-Pluggable connector in anodized aluminum, to match AFM housing material.