

Lightning Sensor

Electrical, Mechanical, and Environmental Specifications

AEM's Lightning Sensor was designed and built utilizing the most advanced electronics and components within one compact unit. Exceptional efforts were made to reduce system noise and to broaden the frequency range in order to create an integrated unit capable of detecting both cloud-to-ground and in-cloud lightning with very high detection efficiencies. Our Lightning Sensor has an industry leading broad frequency range extending from 1Hz to 12 MHz; which is 20x higher than other sensors in the marketplace.

COMMUNICATIONS: ETHERNET		
Electrical	Power Requirements	Power over Ethernet (Includes 100 to 240 volts AC; 50 Hz to 60 Hz PoE Injector)
	Power Consumption	15 watts
	Power Protection	Fused and multiple surge protection devices
Mechanical	Digital Signal Processor Housing	NEMA 4X rated enclosure (NEMA 4X = IP66 definition)
	Mounting	Exterior at base of mast
	Weight	1.6 kg for Digital Signal Processor (DSP)
Antenna	Lightning	Tubular, omni-directional
	GPS	Active patch
	Mounting	Mast mounted
ENVIRONMENTAL OPERATING PARAMETERS		
Outdoor	GPS Antenna	-40 °C to +85 °C
	Lightning Antenna	-40 °C to +85 °C
	Digital Signal Processor	-40 °C to +85 °C
	Wind Speed	216 km/h (mounting dependent)
	Hail	3 cm
	Rain	NEMA 4X rated enclosure
	Humidity	100% condensed
	Ice	2.5 cm
	IP Rating	IP66

Operational characteristics

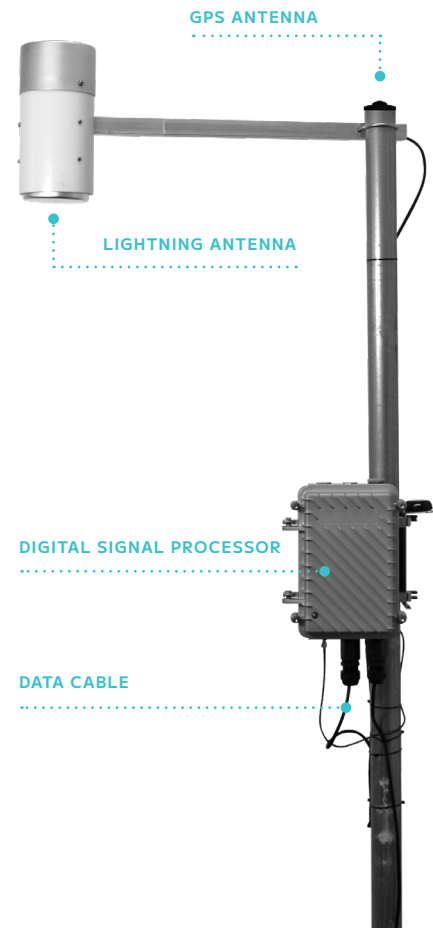
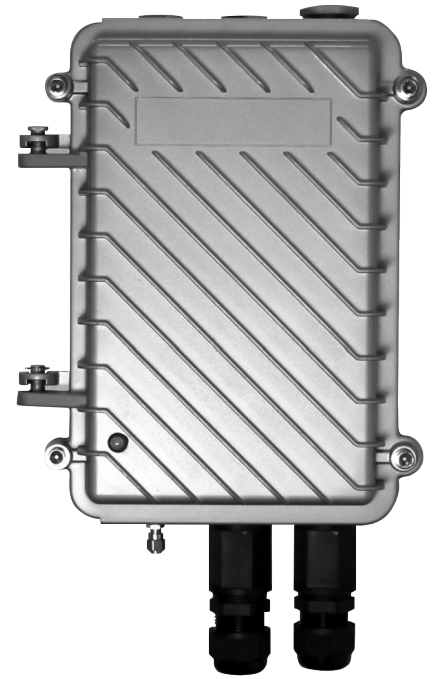
Types of Lightning Detected	Cloud-to-Ground (CG) and In-Cloud (IC)
Location Accuracy	<100 meters (density dependent)
Detection Efficiency	Up to 97% total lightning detection efficiency (based on network density)
Sensor Baseline	20 km to 400 km
Sensor Sitting Criteria	Roof or tower mounted on existing structures with power and internet connectivity
Sensor Radio Frequency Bandwidth	1 KHz to 12 MHz (industry leading); 20x more
Sensor Timing Accuracy	<15 nanoseconds
Sensor Re-Arm Time	None
Waveform Digitization	Fully digital system. Full waveforms delivered from sensor
Points in Waveform	~1000 points per second. Full waveform analysis available
Digitizing Resolution	16 bit
Digitizing Speed	25 MHz



Digital Signal Processor (DSP)

The Digital Signal Processor (DSP) converts each signal from analog to digital, then uses filtering technology to remove noise and compress each waveform to produce greater location accuracy and detection efficiencies.

DSP SPECIFICATIONS		
	Fully Digital System	Small footprint and low power requirements
Remote Monitoring and Control	Sensor Sensitivity Control	Adjustable sensor gain Remote calibration of system
	Remote Configuration	Fully remote firmware configuration and upgrades
	Remote Diagnostics	Remote login; continuous monitoring Sensor stat; connectivity, data, QA/QC
Reliability and Maintenance	Mean Time to Failure	10 years
	Mean Time to Response	Continuous remote monitoring and support



Hardware and specifications

The lightning and weather instrumentation consists of separate instruments feeding into a common network data appliance. The instruments and associated specifications are provided below.

DEVICE	WEIGHT	DIMENSIONS (LXWXH)
Digital Signal Processor	1.6 kg	30 cm x 19 cm x 8 cm
Lightning Antenna	1.0 kg	24 cm x 12 cm x 62 cm; cable length 4 m
GPS Antenna	0.23 kg	4.4 cm x 4.2 cm x 1.3 cm
Data Cable	2.95 kg	60.9 m Length