

Zoological Control And Data Acquisition System

The ZooCADA system is a modular, networked, software and hardware solution designed to automatically monitor, record, and control animal enclosure environments, and back-of-house plant, at zoological parks.

- ★ Control enclosure climate and lighting with seasonal variation.
- ★ Collect enclosure climate data to support research and management.
- ★ Email enclosure temperature errors and other alarms to staff.
- ★ Enable staff to focus more on animal care and conservation tasks.



Meet The ZooCADA Family

ZooCADA-Log: Climate monitoring for exhibit enclosures.

- Monitor and log enclosure and external temperature and relative humidity measurements.
- Monitor and log enclosure soil moisture and temperature measurements. (Optional)
- Alarm email messages for enclosure temperature too high or too low, and other system events.
- Datalogger web interface enables remote viewing of station measurements and other parameters.
- Data files downloadable to Windows based PC using Campbell Scientific LoggerNet software.

ZooCADA-HVAC: Climate monitoring and control for exhibit enclosures.

- All ZooCADA-Log functions plus...
- Fully automated control of enclosure ventilation fan and air conditioning equipment.
- Enclosure climate maintained with automatic seasonal temperature variation using monthly setpoints.
- Run times of the ventilation fan and air conditioning logged as hourly and daily totals.
- Manual override controls.

ZooCADA-Life: Complete environment monitoring and control for nocturnal or diurnal exhibit enclosures.

- All ZooCADA-HVAC functions plus...
- Automatic four channel lighting controller designed for permanently installed, dimmable, lighting loads.
- Configurable channels for plant grow lights (Daylight lighting), and LED ribbon lights (Moonlight lighting).
- Gradual sunrise/sunset transitions between daylight and moonlight lighting scenes using dimmer crossfade.

ZooCADA-Lab: Environment monitoring and control for breeding labs and hospital rooms.

- All ZooCADA-Life functions, except soil sensor, plus...
- Lighting control designed for pluggable, non-dimmable, lighting loads.
- Lighting control user selectable for various diurnal and nocturnal modes.
- Up to nine portable sensors for microclimate monitoring.

ZooCADA-Store: Monitoring for food storage rooms.

- Monitor and log the temperatures of 3 food storage rooms, typically a walk-in Freezer, Fridge, and Pantry.
- Alarms for each room temperature too high or too low, power failure, and other system events.
- Door open too long alert sounder, and door left open alarm.
- Safety panic alarm to summon help if person trapped in a refrigerated room.

ZooCADA-Met: Weather Station for climate monitoring.

- Monitor and log the air temperature, relative humidity, dew point, barometric pressure.
- Monitor and log solar radiation, rainfall and lightning strikes.
- Alarms for high wind speed, high rainfall, and high and low air temperature.
- Data shared via IP network to all ZooCADA stations on the network.

ZooCADA-Mod: Customisation Module.

• Add custom sensors, processing and/or data logging to ZooCADA station for site specific applications.

ZooCADA is a modular, zoo-wide, networked, control and data acquisition system. Each station is able to operate standalone or as an integral part of a fully networked site-wide system. Using our modular approach, up to 4000 stations, distributed over any geographic area can be networked providing that network connectivity (typically the site's IP computer network) is available at each station.

Adena Scientific believes that accuracy and reliability are paramount requirements of any system used in applications that support animal welfare, so we purpose designed our ZooCADA system to meet zoological needs, and built it to run on dataloggers manufactured by Campbell Scientific in the USA and available worldwide.

Adena Scientific Ltd

ZooCADA Stations Feature Matrix

	log	Ηνας	Life	Lah	Store	Mot
Enclosure Data Logging	LOG	IIVAC	Life	Lab	30016	wiet
Air Tomperature and Delative Humidity	V	V	V	v		
Air Temperature and Relative Humany	r V	T V	T V	T V	-	-
Air Manaur Prossure and Manaur Prossure Deficit	r V	T V	T V	r V	-	-
All Vapour Pressure and Vapour Pressure Dencit	r V	r V	r V	T	-	-
Soil Temperature 100 mm Deen	r V	T V	T V	-	-	-
Soli Temperature, 100 mm Deep	ř	Ŷ	ř	-	-	-
External weather Data Logging		N N	Ň	N/	0	N/
Air Temperature and Relative Humidity	0	Y	Y	Y	0	Y
Air Dew Point Temperature	0	Y	Y	Y	0	Y
Air Vapour Pressure and Vapour Pressure Deficit	0	Ŷ	Y	Ŷ	0	Y
Barometric Pressure	0	0	0	0	0	Y
Solar Radiation	-	-	-	-	-	Y
Precipitation (Rainfall, Dew)	-	-	-	-	-	Y
Wind Vector Direction and Speed	-	-	-	-	-	Y
Wind Max Gust Direction and Speed	-	-	-	-	-	Y
Grass Minimum Temperature	-	-	-	-	-	0
Volumetric Soil Water Content	-	-	-	-	-	0
Soil Temperature (100 mm Deep)	-	-	-	-	-	0
Special Purpose Data Logging						
Food Storage Temperature (Refrigeration) Monitoring	-	-	-	-	Y	-
SDI-12 Wall Sockets For Portable Sensors	-	-	-	0	-	-
Customisable With Additional Sensors	Y	Y	Y	Y	Y	Y
HVAC Control Functions						
Ventilation Fan Control Automatic	-	Y	Y	Y	-	-
Air Conditioning Control Automatic	-	Y	Y	Y	-	-
Dehumidifier Control Automatic	-	-	Y	Y	-	-
Humidifier Control Automatic	-	-	Y	Y	-	-
Seasonal Variation of Temperature Automatic	-	Y	Y	Y	-	-
Daily Temperature Variation Within Setpoints Automatic	-	Y	Y	Y	-	-
Temperature Setpoints User Adjustable	-	Y	Y	Y	-	-
Lighting Control Functions						
Portable Pluggable Lighting (Switched Loads)		_	0	Y	_	
Permanent Enclosure Lighting (Dimmable Loads)	-	_	Ŷ		_	-
Seasonal Variation of Day Length Automatic	_	_	Y	v	_	-
Switched Changes Of Lighting Scene Automatic	_	_	0	v		
Dimmer Controlled Sunrise/Sunset Crossfades Automatic	_	_	v	_	_	-
Selectable Diurnal or Nocturnal Lighting Mode			v	v		
Supplementary Heat or LIV Lamps (Switched Loads)	-	-	v I	r V	-	-
Enclosure Alarm Eurotions	-	-	1	1	-	
Enclosure Alarm Functions	V	V	V	V		
Temperature Too High or Too Low	Y	Ŷ	Y	Y Y	-	-
Relative Humidity Too High or Too Low	-	- -	Y	Y	-	-
Temperature/RH Sensor Failure	Ŷ	Ŷ	Ŷ	Ŷ	-	-
External Alarm Functions						
Extreme High or Low Air Temperature	-	-	-	-	-	Y
High Rainfall	-	-	-	-	-	Y
High Wind Speed	-	-	-	-	-	Y
All-In-One Weather Sensor Failure	-	-	-	-	-	Y
Temperature/RH Sensor Failure	Y	Y	Y	Y	Y	-
Barometric Pressure Sensor Failure	0	0	0	0	0	-
Power Failure	Y	Y	Y	Y	Y	-
Special Purpose Alarm Functions						
Freezer Temperature Too High or Too Low	-	-	-	-	Y	-
Fridge Temperature Too High or Too Low	-	-	-	-	Y	-
Pantry Temperature Too High or Too Low	-	-	-	-	Y	-
Refrigeration Circuit Breaker Tripped	-	-	-	-	Y	-
Refrigeration Door Left Open	-	-	-	-	Y	-
Safety Panic Button Inside Refrigerated Rooms	-	-	-	_	Y	-

ZooCADA Networks



A ZooCADA network comprises of a number of ZooCADA stations connected to an IP computer network, with Campbell Scientific's LoggerNet software automatically downloading logged data and storing it on a central computer/server. A large network, like that shown above, can include failsafe redundancy for the external Temperature and Relative Humidity sensors as this data is used by the algorithm in all stations with HVAC control functions. Stations hosting the primary and secondary external sensors communicate with each other over the network and each of those stations keeps the data from both external sensors in its own communications array. Every station on a ZooCADA network maintains its own copy of the communications array data and any station can communicate with any other station making it easy to distribute the communications array data across the network. If the ZooCADA-Met Weather Station is installed, a suite of meteorological data is made available to the network, in addition to the external Temperature and Relative Humidity data.

The communications array data contains:

- Primary external temperature in degrees C.
- Primary external relative humidity in percent.
- Secondary external temperature in degrees C.
- Secondary external relative humidity in percent.

The ZooCADA-Met Weather Station adds:

- Barometric pressure in hectopascals.
- Solar radiation in Watts per square metre.
- Rainfall rolling 60 minute total in millimetres.
- Rainfall daily total in millimetres.
- Wind vector direction in degrees.
- Wind vector speed in metres per second.
- Wind maximum gust speed in metres per second.

The data for any station can be viewed from computers on the network using a web browser, or from mobile phones using the Campbell Scientific LoggerLink App, if the network is equipped with WiFi.