



## Helmsman AW201 Watch Alarm Installation and Operation





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## Introduction and Scope

The AW201 watch alarm improves marine vessel safety by providing a count-down timer and two stage alarm. The AW201 helps to ensure that the individual at the helm does not become inattentive while on watch. The count-down timer is secured by removal of the key so that the AW201 setting cannot be changed without the captain's authorization.

This manual is intended as a reference for correct installation and operation of the Helmsman AW201 Watch Alarm. Great care has been taken in the design and manufacture of this equipment and in the publication of this manual. Please read and understand the manual completely before installing the equipment. If the installer or operator requires additional assistance, they can obtain that from the manufacturer or from an authorized vendor of the equipment.

## Disclaimer and Declaration of Immunity

A watch alarm is a useful aid to marine vessel safety, but the additional utility provided by the watch alarm does not, under any circumstances, replace a human navigator and does not nullify or diminish the responsibility of the navigator to maintain vigilance and alertness at all times while operating a marine vessel.

The manufacturer disclaims any responsibility for damage, injury, liability, or loss of earnings caused by improper use, installation, or maintenance of this equipment.



## Overview and Features

The Helmsman AW201 Watch Alarm serves two distinct functions on a marine vessel. In normal startup mode it operates as a traditional watch timer. A secondary function is that of an event counter. These modes of operation are mutually exclusive. Refer to the Operation section of this manual for specific information on accessing these modes of operation.

### Watch Timer

The AW201 enables the captain of the vessel to set a count-down interval and to secure it by removal of the key. A large LED display shows the time remaining in minutes and seconds.

During the countdown period the SET/RESET/DIM button can be used only to select display brightness or to restart the countdown period. Holding the button down until the alert sounds once will restart the countdown period. Holding the button down continuously, after the alert sounds twice, allows the user to select LED brightness.

After the count-down interval expires the LED display will begin counting *up* for 30 seconds and an audible alert signal will sound each second, prompting the vessel operator to manually intervene. Pressing the SET/RESET/DIM button clears the local alert condition and restarts the original count-down period.

If the operator fails to respond when the 30 second alert period has expired, the Helmsman AW201 can activate an external alarm, alerting other personnel onboard the vessel. A locked-in general alarm condition will persist until reset with the key or until being cleared by pressing the SET/RESET/DIM button for one second.

### Event Counting Mode

In addition to its primary function as a watch alarm, the AW201 includes an event counter mode. When set in the event-counter mode the LED display will register accumulated counts of specific events. For example, when connected to a bilge pump with the Helmsman CS sensor, the AW201 display will increment each time the pumps are activated. By observing bilge-pump cycles, between regular vessel inspections, the vessel operator can establish a practical metric of progressive leakage conditions which may be occurring on the vessel.



### **Autopilot Interlock**

Some marine insurance providers require that the vessel's automatic pilot system be interlocked to a watch alarm. This requirement is typically satisfied by assuring that the automatic pilot cannot be engaged until the watch alarm is activated.

The Helmsman AW201 Watch Alarm supports this requirement by providing a "logic-level" output that can be used to control a solid-state relay or high-side switch. This output switches to a logical "true" state when the watch alarm is powered normally and the mode selector is in SET or RUN positions.

Refer to the autopilot technical documentation or consult with the autopilot manufacturer for specific instructions regarding a watch alarm interlock. Also refer to the installation section of this manual for detailed specifications and suggested application of the logic output.



## Installation

The Helmsman AW201 Watch Alarm is supplied with the following materials.

- Installation and Operator manual
- Quick operation guide.
- Mounting bracket and knobs
- Mounting fasteners
- Spare fuses
- Spare key
- Cable harness (attached) 6 feet

Before installing the AW201 you will need to give careful thought to a practical mounting location and power source. In addition, you will need to consider how to interconnect the unit to other equipment and to external alarms.

### Location

There are several things to consider when specifying a location for the control unit. Since every installation involves a number of tradeoffs, it is advisable to consult with the vessel captain or individuals responsible for navigating the vessel before permanently installing the unit.

Since a watch timer and alarm is considered to be ancillary equipment for navigation, it does not need to be located directly at the helm-station, but it should be placed close enough so that the operator can view the LED display and hear the alert tone. Also, it should not be installed so close that the operator can reset it without actually standing up and leaving his chair. The AW201 should be situated so that the operator is compelled to stand periodically in order to reset the timer. The purpose after all is to ensure the vessel operator's alertness. If the operator can reach the SET/RESET/DIM button without leaving his chair it is too close.

Once the location has been established, the AW201 control unit can be surface mounted using the stainless-steel mounting yoke and fasteners.

### Powering the Unit

The Helmsman AW201 operates on DC supply voltages ranging from 9VDC to 40VDC. A fuse holder is located on the back of the unit. The recommended fuse is a 2-amp fast blow, 5 X 20mm type. Typical power consumption is less than 1 watt at 12VDC.

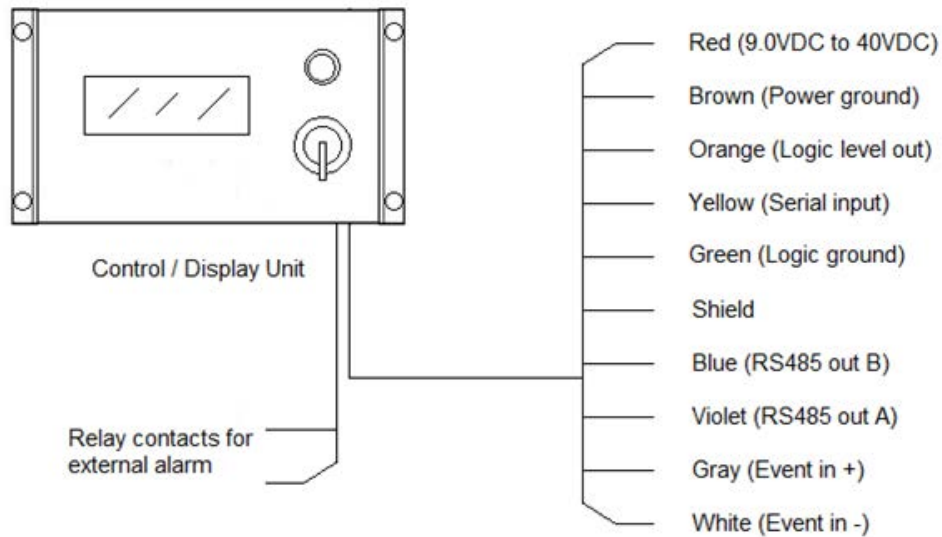


It is recommended that the Helmsman Watch Alarm be powered from the same DC breaker as the autopilot. Since an autopilot interlock is often required, having the autopilot and watch alarm on the same breaker is advisable.

### Cabling and Connections

The Helmsman AW201 Watch Alarm is supplied with a 2-meter interconnection cable having “flying leads”. A breakout diagram of the multiconductor cable is shown below. The unit also has a separate 2-meter cable for switching an external alarm. This cable connects to internal relay contacts.

Both cables can be extended without affecting the performance of the AW201. Explained below is the function of each connection according to wire color.





Power (red): Connected to the positive side of the ships DC distribution. The Helmsman Watch Alarm can operate over a wide range from 9VDC to 40VDC while drawing less than 1 watt from the DC source. It is recommended that the Helmsman Watch Alarm be connected to the same breaker as that used for the vessels automatic pilot.

Ground (brown): Power ground; connected to the vessels DC distribution ground.

Logic output (orange): This logic level output goes “true” (+5VDC) when the watch alarm is in the SET or RUN modes. The output has an impedance of 500Ohm and can be used to control a solid-state relay.

Serial input (yellow): Used for initial programming or installing software upgrades in the AW201 microcontroller.

Logic ground (green): Signal ground when programming the AW201. Also signal ground for logic out.

Data out (blue): “B” output from an internal RS485 differential line driver. A and B can be used for future application.

Data out (violet): “A” output from the same RS485 differential line driver as output “B” above.

Event in (gray): Positive input for the event counter. This input is connected to the internal microcontroller via an optocoupler to ensure electrical isolation between the watch alarm unit and any external event trigger sources.

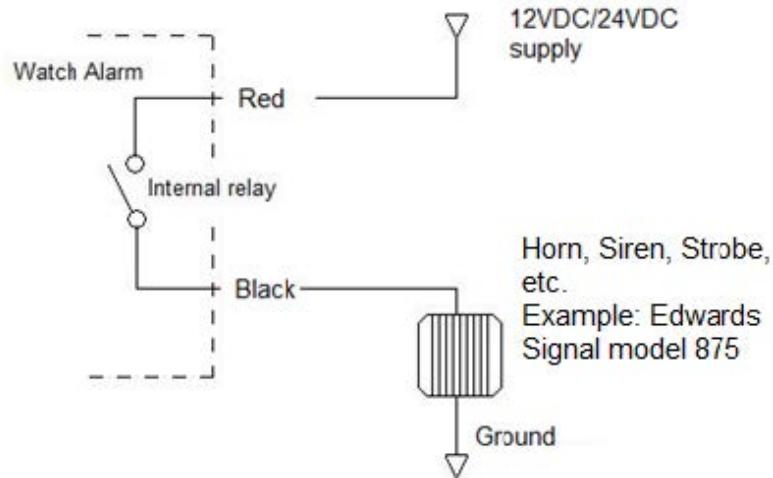
Event input (white): Negative (or ground) input for event counter. See above.

### **External Alarm Relay**

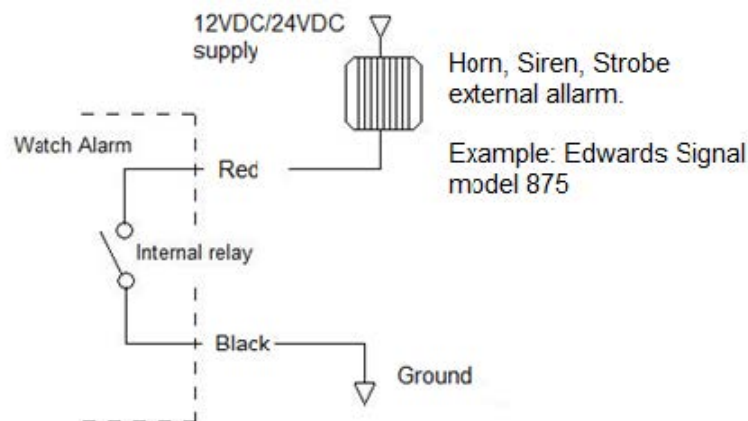
The Helmsman AW201 Watch Alarm has an internal Form C relay that provides dry contacts used to switch on an external alarm, horn, strobe-light, etc. The relay contacts are electrically isolated from the watch alarm circuitry and brought out from the unit via a 2m, two conductor, shielded cable.

Loads connected to the relay should be limited to 2 Amps or less. If a higher load is to be connected then an external relay, having a higher amperage rating, should be used. The following diagrams illustrate how the AW201’s internal relay can be applied in various configurations.

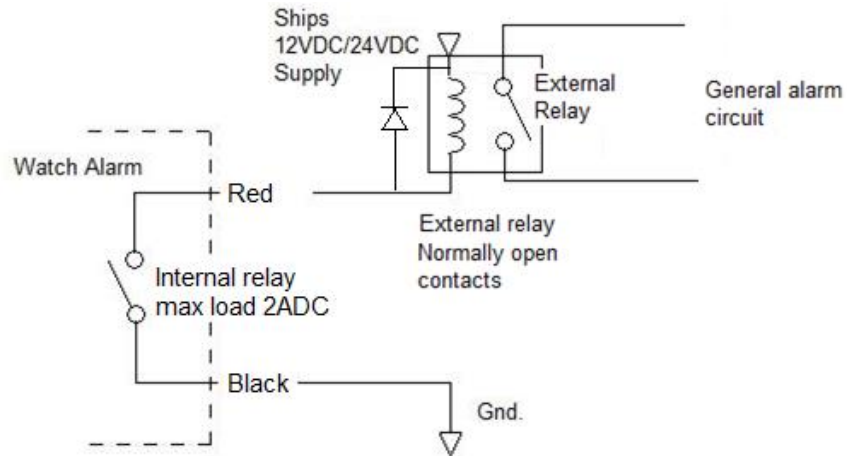




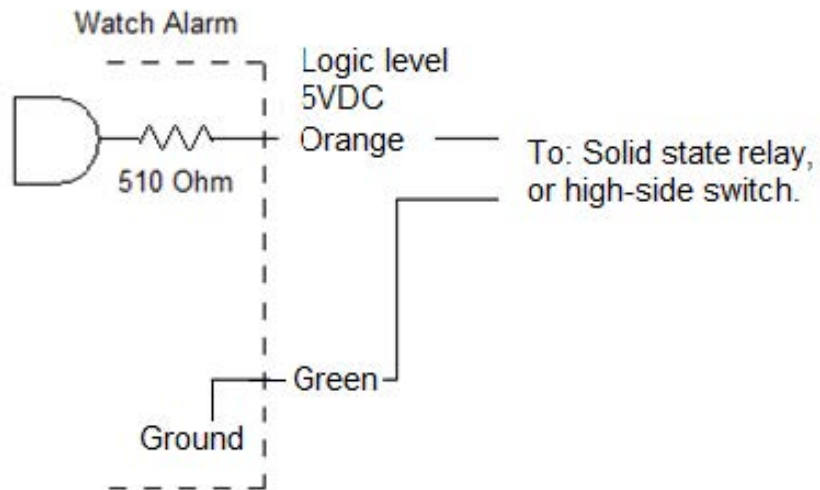
In the example shown above the internal relay is used to switch DC power to an external alarm module.



In the example above the internal relay supplies a ground to the external alarm module.

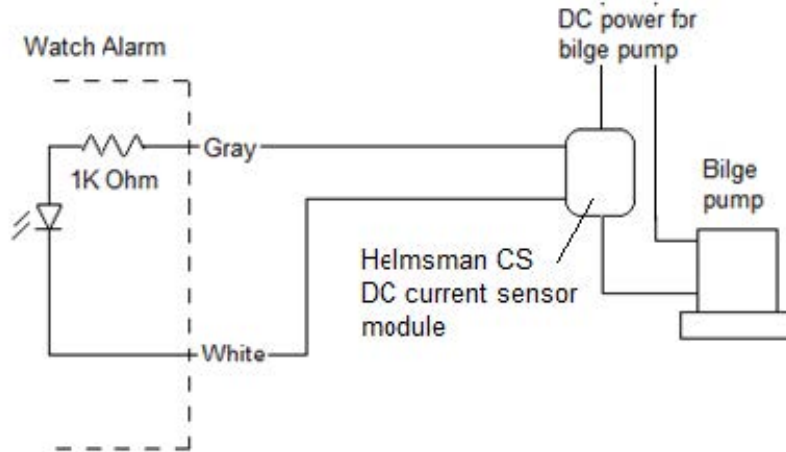


In this example the internal relay switches an external relay having higher amperage capacity.

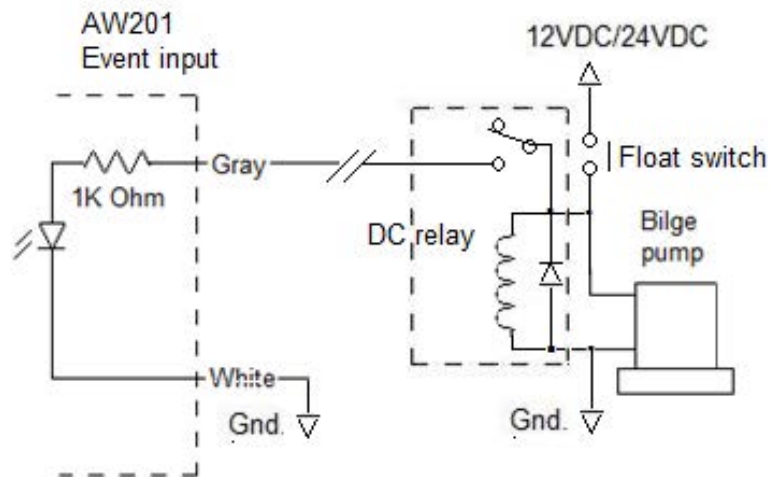


Autopilot interlock connection.

## Connecting an event input



Helmsman CS Isolated Current Sensor connected to the event input.



Using a DC relay across the bilge pump to activate the event input.



## Testing the Installation

After installing the Helmsman AW201 Watch Alarm, it is imperative that all functions be tested to verify that the installation conforms to specification. If there are errors found these should be corrected at once. If there are any defects detected in the Helmsman AW201 Watch Alarm that is, the product does not perform according to specification, then it is your responsibility to notify the supply vendor or manufacturer immediately to arrange for technical support or replacement. Contact information appears on the inside cover of this manual.

## Testing the Watch Alarm Function

The Helmsman AW201 Watch Alarm has a built-in power-on-self-test algorithm that test display and alert functions. This self-test is run each time the unit is switched on. The external alarm activation must be tested manually. The installer should perform the following steps after the installation is completed, this is to verify that the equipment works as specified. The normal start up sequence executes as follows.

- a. Turn the key-switch to the “SET” position.
- b. The display briefly shows “8888” and the alert tone sounds twice.
- c. The display clears to “0000” and the colon symbol “:” appears.
- d. This concludes the power-on self-test sequence.
- e. Press and hold the SET/RESET/DIMMER button. The digital display should advance in one-minute increments. Set the count-down interval to 1 or 2 minutes.
- f. Turn the key-switch to “RUN”
- g. The display will now begin counting down in 1 second intervals.
- h. While the watch alarm is in “RUN” mode, press and hold the SET/RESET/DIMMER button. The display intensity will diminish each second and then return to full brightness. The intensity setting cycles in a loop.
- i. Allow the count-down interval to time out. On reaching time 00:00 the local audible alert tone will sound each second while the display begins to count up in one second intervals.
- j. Before reaching a count of 00:30 (30 seconds) press the SET/RESET/DIMMER button.



k. The display will revert to its original count-down interval and begin counting down again.

l. Repeat steps (a) through (k), and again allow the count-down interval to reach 00:00 and then begin counting up to 00:30 again.

m. After counting up to 30 seconds the alert tone will begin sounding two times each second and the internal relay will close, causing the external alarm to activate.

n. Press the SET/RESET/DIMMER button for one second to clear the audible alarm condition. The general alarm will silence, the original countdown period will be restarted, and the LED display will begin counting down again.

o. If the unit fails to perform as specified during this test then contact the vendor or manufacturer for technical support or product replacement.

p. This concludes the test of the AW201 Watch Alarm.

### **Testing the Event Counter Function**

As a secondary function the Helmsman AW201 Watch Alarm can also be used as a bilge pump event counter. Refer to the wiring diagram and example diagrams. The event input can be a DC voltage between 5 and 32 VDC This voltage range covers typical supply voltages used on marine bilge pumps.

Note that to register as an “event” the voltage must be sustained for 5 seconds. This time requirement is intended to eliminate false counts that could be generated by the new timer based “automatic” bilge pumps.

Set the Helmsman Watch Alarm to the event mode.

1. Turn the unit off.
2. Hold down “SET/RESET/DIM” button.
3. Rotate the key-switch to RUN (The display will show “0000” while the audible alert sounds 3 times)
4. Release the SET/RESET/DIM button. The unit is now in event counter mode.

Testing the event counter is quite simple. Most marine bilge pumps include a “Manual” control switch that manually activates the bilge pump. Hold the switch in Manual mode for at least 5 seconds observe that the display increments by one count. This can also be accomplished by lifting the float-switch for at least 5 seconds then observing that the display increments one count. This concludes the event counter test.



## Operation

### Setting the AW201 Watch Alarm

To set the countdown period simply turn the key switch to SET position. The alert tone will sound twice. Press or hold the SET / RESET / DIMMER button until the desired count-down period is shown on the display. Turn the key-switch to RUN position. The alert tone will sound three times and the digital display will begin counting down in one second intervals.

The captain can now remove the key to secure the countdown period.

After the AW201 watch alarm is secured the SET / RESET / DIMMER button can be used only to restart the countdown interval or to set display brightness.

### Restarting the countdown period

To restart the countdown interval, press the SET / RESET / DIMMER button until the alert beeps once then release the button. The countdown period will start over.

### Setting display brightness

To change display brightness, press the SET / RESET / DIMMER button and keep it pressed after the alert sounds twice. Holding the button down enables the Helmsman to cycle through several brightness levels in a repeatable loop. Select the illumination level that is most appropriate for ambient conditions.

### Alert Condition

If the displayed count reaches zero ("00:00") an alert tone will sound at one second intervals. The display will then begin counting up for a period of 30 seconds. Pressing the SET/RESET/DIMMER button during this alert condition will silence the alert tone and restart the countdown period to its initial setting.

### Alarm Condition

If the SET/RESET/DIMMER button is not pressed within the 30 second alert period an internal relay will close enabling a general alarm condition. The Helmsman Watch Alarm will remain in the alarm condition until the key-switch is turned to OFF, the power is removed, or until the operator over-rides the alarm by pressing the SET/RESET/DIMMER button down for 1 second.



### **Setting the event counter mode**

To initiate the event-counter mode:

1. Turn the key switch to the OFF position.
2. Hold the SET/RESET/DIMMER button down while turning the key switch to the RUN position. Hold the button down for several seconds.
3. The alert tone will sound three times and the display will clear to "0000".
4. Release the SET/RESET/DIMMER button. The Helmsman is now operating as a pump cycle counter.

The counter is able to log 9999 pump cycles. Over time the vessel operator will develop a sense of the typical number of pump cycles that occur between regular vessel inspections. A noticeable increase in the cycle count is a good indication that progressive leakage is occurring. A higher count after heavy rains, for example, may indicate a leaky deck while a higher count during dry weather may suggest progressive leakage elsewhere such as the shaft seal or corroded sea-cock. Alternatively, an unusually low count may indicate that the bilge pump is becoming unreliable.

*[Note: In order to use the Helmsman Watch Alarm as a bilge pump cycle counter you will need to detect pump activity and convert it to a dc voltage (5 to 32 VDC) on the AW201 event input. This can be done with a DC relay connected to the pump motor or by connecting the Helmsman CS current switch. The pump activity is communicated to the Helmsman's optically-isolated input. Refer to the installation section of this manual for more information.]*



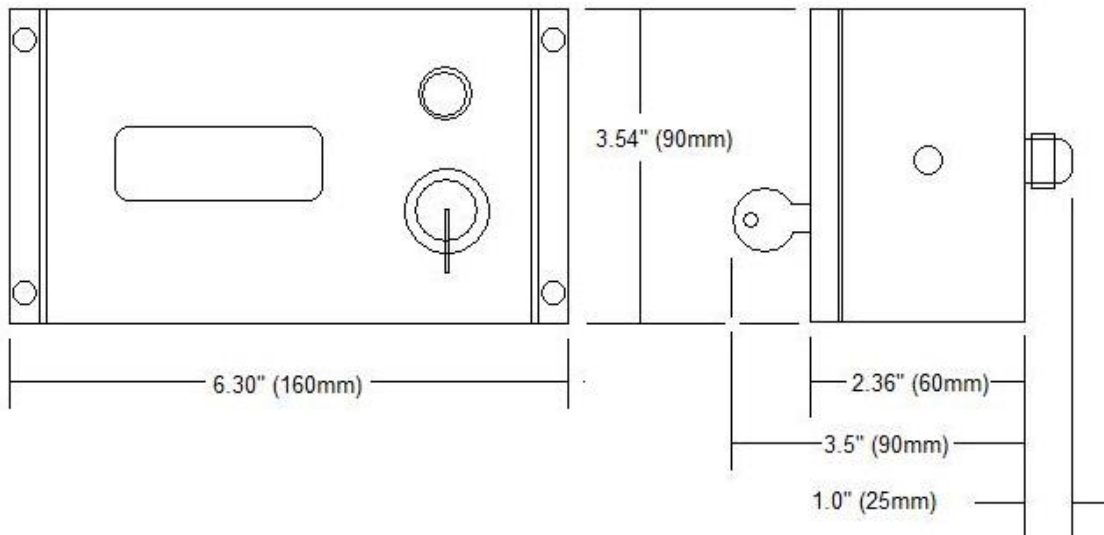
## Specifications

### Physical

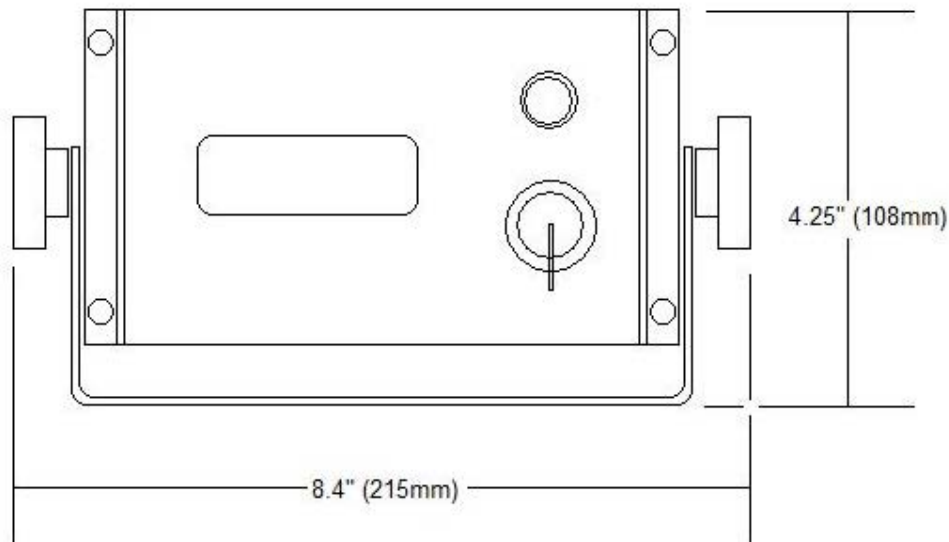
Dimensions: When mounted on bracket 8.4" wide, 4.3" high, 2.5" deep  
Weight: 1 lb. (.45 Kg)  
Enclosure seal: IP53 equivalent, indoor use.  
Materials exposed: Polycarbonate and ABS (enclosure), 304 Stainless steel.  
Operating temp: -10 to 55 C  
Mounting: Bracket yoke.

### Electrical

Supply voltage: 9.0VDC to 40.0VDC (min. max. limits)  
Power: < 1W @12VDC, <6W@40VDC  
Relay contacts: Dry contacts N.O., Isolated from chassis. 2.0 Amp DC max.  
Logic output: True is 5VDC, false is 0VDC. 510 Ohm source impedance.  
Pump sensor input: 1000 Ohm input resistance via photodiode isolator. Operable at 5 to 32VDC.







## Maintenance

The Helmsman AW201 Watch Alarm has a built-in self-test that executes each time the unit is turned on. During this self-test the local alert tone will sound and all LED display elements will illuminate. It is advised that before regular annual vessel inspection, such as USCG safety inspection or insurance inspection, that the vessel owner actually allow the AW201 to run through a countdown alarm cycle and confirm that the external alarm activates reliably and runs for a sustained period of at least 30 seconds.

## Warranty and Technical Support

The Helmsman AW201 is warranted to be free of defects and failure for 2 years after the date of installation. To return of this product for service contact Southeast Instruments LLC at 907-518-0341 or [Helmsmantek@gmail.com](mailto:Helmsmantek@gmail.com).