

Heliotrack Programmable Wind Alarm Switch V1.0 WITH FIRMWARE VERSION 1.1 or 1.2
Firmware Version is shown on Power Up: Display 1-“x” for Firmware 1.”x” where “x” is 0, 1, or 2
 Developed in partnership with Inspeed.com, LLC

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Features:

- 9-36 VAC or VDC power supply input
- Wind speed up
- Two alarms with relay or logic outputs
- Display in MPH, KPH, Knots, Ft/sec, M/sec, or user-calibrated
- User-settable wind speed averaging up to 60 seconds
- Each alarm has independent ON and OFF wind speed thresholds
- Each alarm has a latch timer adjustable from 0 – 255 minutes
- Each alarm can be set to latch until manually reset
- 3 digit display indicates wind speed up to 255 units
- Screw terminals for easy connections

Possible Applications:

- Parking solar panel trackers in high wind
- Retracting RV awnings for high wind protection
- High wind alarm for crane operators
- Turn water pumps on or off for outdoor fountains
- Any application that requires some action based on wind speed

Specifications:

Specification	Value
Input Power supply	9 – 36 Volts AC or DC
Idle current drain	.020 Amps
Logic power supply	5.0 Volts DC (.5 amps)
Relay contacts	36V @ 10 AMPS
Operating Temperature	-40C to +150C (PCB and components)

Wind Switch Alarm circuit description:

The wind alarm switch will turn on or off electrical load up to 10 amps, based on a 5V pulse or a 0V-5V analog input.

Display:

The display is 3 digits capable of displaying wind speed up to 255 units (MPH, KPH, Knots, Meters/sec, Feet/sec, or user calibration). The display also shows programming parameters and parameter values while in programming mode.

Installation instructions:

- 1) Mount controller in desired location.
- 2) Mount anemometer sensor in desired location.
- 3) Punch open as many of the holes in the weather-tight gland as needed for wire connections (wind sensor, power, devices...). Connect power wires to the controller, making sure they are not energized.
- 4) Connect the anemometer sensor wires: If you have a reed sensor use the SENSOR and GND terminals. If you have a hall sensor you will likely use the +5 terminal as well
- 5) Turn on power supply 9 – 36 volts AC or DC.



- 6) Program controller with desired settings.
- 7) Replace the cover on the control box when you are satisfied that everything is working properly. Do not over-tighten the screws on the lid, this can cause the lid to warp resulting in an improper seal. For permanent outdoor installations it is a good idea to put a bead of caulking around the cable penetrations if watertight grommets are not being used.

Relays:

Relays are rated up to 48 volts @ 10 amps. If you wish to use logic level outputs only then the relay enable jumpers (J1 & J2) should be removed. These jumpers interrupt current to the relay coils.

POWERUP:

When the controller turns on it will display the software version for a couple of seconds "1-0" or "1-1" and then start displaying the current wind speed. If you have version 1-0 firmware then this is the WRONG MANUAL.

Run Mode: This is the default mode when power is connected or after resetting.

Button 1: Enter Programming mode

Button 2: Turn on Alarm 1 when pressed, display Alarm 1 on-threshold. Alarm 1 Latch is reset when button is released.

Button 3: Turn on Alarm 2 when pressed, display Alarm 2 on-threshold. Alarm 2 Latch is reset when button is released.

Button 4: Step through display modes: 1-Instantaneous wind speed : 2-Average wind speed : 3-Maximum wind speed : 4-Off

Pressing Buttons 1, 2, or 3 will also clear the maximum wind speed

Reset Button: Used with Buttons 1 & 2 for restoring controller to the factory presets. Pressing the reset button may cause the relays to chatter, remove the relay jumpers before resetting if sensitive or high power loads connected to the relay outputs. Holding down Buttons 1 and 2 while powering up or pressing the reset button will restore the controller to the factory presets.

Programming Mode: Press Button 1 to enter programming mode.

Button 1: Exit Programming mode and save changes.

Button 2: Move to next Parameter. Parameters will increase to 255 and then roll over to 0.

Button 3: Add 1 to current parameter.

Button 4: Add 10 to current parameter.

Parameter 1: 0–2 Measuring Method

Factory Default = 0

0 - Pulse Timer Mode: Wind speed is determined by measuring the time between each reed sensor pulse.

1 - Pulses Per Period Mode: Wind speed is determined by counting the number of pulses per unit of time.

2 – Analog input: Will display a value of 0 – 255 depending on the input voltage. The sensor input has a 1K series resistor and is then biased with 10K pull-up resistor. This allows a PTC thermistor to be connected directly between the SENS and GND terminals to display a value that increases with temperature.

When the Pulses Per Period mode is selected the wind speed refresh rate on the display will be between 2 and 5 seconds depending on the Wind Speed Units parameter value.

Approximate wind speed display refresh rates for Pulses Per Period mode are:

0 - MPH - 2.5 seconds

1 - KPH - 5 seconds

2 - Knots - 2.2 seconds

3 - Feet/Seconds - 5 seconds

4 - Meters/Seconds - 1.5 seconds

5 - User calibrated - Variable

Parameter 2: 0–5 Wind Speed Units

Factory Default = 0

- 0 - MPH (1-255)
- 1 - KPH (1-255)
- 2 - Knots (1-255)
- 3 - Feet/Second (1-255)
- 4 - Meters per second (1-127)
- 5 - User calibrated

Parameter 3: 0-60 Wind Speed Averaging Time

Factory Default = 0

- 0 - No averaging, instantaneous wind speed is displayed.
- 1-60 - Number of seconds over which the wind speed is averaged.

In Pulses Per Period Mode there is a minimum averaging time of approximately 2 – 4 seconds depending on the “Wind Speed Units” parameter setting.

Parameter 4: 0–3 Alarm Trigger Method

Factory Default = 0

- 0 - Alarm 1 triggered by average wind speed. Alarm 2 triggered by average wind speed.
- 1 - Alarm 1 triggered by instantaneous wind speed. Alarm 2 triggered by average wind speed.
- 2 - Alarm 1 triggered by average wind speed. Alarm 2 triggered by instantaneous wind speed.
- 3 - Alarm 1 triggered by instantaneous wind speed. Alarm 2 triggered by instantaneous wind speed.

Parameter 5: 0–255 Alarm 1 On Threshold

Factory Default = 0

- 0 - Alarm 1 Off
- 1-255 - Alarm 1 turns on when wind speed is equal to this selected value.

Parameter 6: 0–255 Alarm 1 Off Threshold

Factory Default = 0

- 0 - Alarm 1 Latches until reset
- 1-255 - Alarm 1 turns off when wind speed is less than this selected value.

This value may not be greater than Alarm 1 On Threshold, the program will not allow it and will adjust during data save if needed.

Parameter 7: 0–255 Alarm 1 Latch Timer

Factory Default = 0

- 0 - Latch disabled
- 1-255 - Minutes that Alarm 1 Latch will stay on.

The Latch Timer is not entirely precise...

- A setting of 1 will result in a latch time between 0 and 1 minutes.
- A setting of 2 Will result in a latch time between 1 and 2 minutes.
- A setting of 3 Will result in a latch time between 2 and 3 minutes.
- And so on...

Parameter 8: 0 – 255 Alarm 1 On Timer

Factory Default = 0

- 0 – Alarm 1 On Timer is disabled. Alarm 1 will stay on until released by the latch timer, or manually reset.

- 1-255 - Alarm 1 will stay on for selected number of seconds after wind speed has gone above the Alarm 1 On Threshold.

When Alarm 1 On Timer is enabled Alarm 1 must be cleared manually by pressing the AL1 or AL2 buttons. This is meant to keep the wind switch from trying to retract an awning more than once during a storm.

The Alarm 1 On Timer is accurate to the nearest second...
 A setting of 1 will result in a latch time up to 1 second.
 A setting of 2 will result in a latch time between 1 and 2 seconds.
 A setting of 3 will result in a latch time between 2 and 3 seconds.
 And so on...

Parameter 9: 0–6 Alarm 1 Output Logic - *Available at “AL1” pin on the circuit board
Factory Default = 0

- 0 - On = Ground (Relay 1 on) / Off = +5V (Relay 1 off)
- 1 - On = Ground (Relay 1 off) / Off = Weak pull-up +5V (Relay 1 off)
- 2 - On = +5V (Relay 1 on) / Off = Ground (Relay 1 on)
- 3 - On = Weak pull-up +5V (Relay 1 off) / Off = Ground (Relay 1 on)
- 4 - On = Hi-Z (Relay 1 unpredictable) / Off = +5V (Relay 1 off)
- 5 - On = Hi-Z (Relay 1 unpredictable) / Off = +5V (Relay 1 on)
- 6 - On = Ground (Relay 1 on) / Off = Hi-Z (Relay 1 unpredictable)

*There should always be at least a 1K ohm resistor connected between any external circuitry and the Alarm 1 and Alarm 2 logic pins. Failure to observe this rule may result in damage to the microprocessor chip and voids any warranty.

Parameter 10: 0–255 Alarm 2 On Threshold
Factory Default = 0

- 0 - Alarm 1 Off
- 1-255 - Alarm 1 turns on when wind speed is equal to this value.

Parameter 11: 0–255 Alarm 2 Off Threshold
Factory Default = 0

- 0 - Alarm 1 stays on until manually reset.
- 1-255 - Alarm 1 turns off when wind speed is less than this value.

This value may not be greater than Alarm 2 On Threshold, the program will not allow it and will adjust during data save if needed.

Parameter 12: 0–255 Alarm 2 Latch Timer
Factory Default = 0

- 0 - Latch disabled
- 1-255 - Alarm 2 will stay on until the wind speed has gone below the Off Threshold for the selected number of minutes.

The Alarm 2 Latch Timer can be manually reset by pressing the AL2 button.

The Latch Timer is accurate to the nearest minute...
 A setting of 1 will result in a latch time up to 1 minute.
 A setting of 2 Will result in a latch time between 1 and 2 minutes.
 A setting of 3 Will result in a latch time between 2 and 3 minutes.
 And so on...

Parameter 13: 0 – 255 Alarm 2 On Timer
Factory Default = 0

- 0 – Alarm 2 On Timer is disabled. Alarm 2 will stay on until released by the latch timer or is manually reset.

- 1-255 - Alarm 2 will stay on for selected number of seconds after wind speed has gone above the Alarm 2 On Threshold.

When Alarm 2 On Timer is enabled Alarm 2 must be cleared manually by pressing the AL1 or AL2 buttons. This is meant to keep the wind switch from trying to retract an awning more than once during a storm.

The Alarm 1 On Timer is accurate to the nearest second...
 A setting of 1 will result in a latch time up to 1 second.
 A setting of 2 will result in a latch time between 1 and 2 seconds.
 A setting of 3 will result in a latch time between 2 and 3 seconds.
 And so on...

Parameter 14: 0 – 6 Alarm 2 Output Logic - *Available at “AL2” pin on the circuit board

Factory Default = 0

- 0 - On = Ground (Relay 2 on) / Off = +5V (Relay 2 off)
- 1 - On = Ground (Relay 2 off) / Off = Weak pull-up +5V (Relay 2 off)
- 2 - On = +5V (Relay 2 on) / Off = Ground (Relay 2 on)
- 3 - On = Weak pull-up +5V (Relay 2 off) / Off = Ground (Relay 2 on)
- 4 - On = Hi-Z (**Relay 2 unpredictable) / Off = +5V (Relay 2 off)
- 5 - On = Hi-Z (**Relay 2 unpredictable) / Off = +5V (Relay 2 on)
- 6 - On = Ground (Relay 2 on) / Off = Hi-Z (**Relay 2 unpredictable)

*There should be a 1K ohm or greater resistor connected between any external circuitry and the Alarm 1 and Alarm 2 logic pins. If current through these pins exceeds 50 milliamps the microprocessor can be damaged. This failure is not covered by warranty.

** These modes are used for logic level interface, the relay coil jumpers should be removed.

Parameter 15: 0 – 255 Pulse Timer Clock (Low Byte)

Factory Default = 213

0-255 - Pulse timer clock that determines wind speed scale.
 Factory Preset Values are...

- 213 MPH (Pulse Timer Clock High Byte = 255 / Pulse Timer Scale = 255)
- 173 KPH (Pulse Timer Clock High Byte = 255 / Pulse Timer Scale = 255)
- 220 Knots (Pulse Timer Clock High Byte = 255 / Pulse Timer Scale = 255)
- 185 Feet/Second (Pulse Timer Clock High Byte = 255 / Pulse Timer Scale = 255)
- 220 Meters/second (Pulse Timer Clock High Byte = 255 / Pulse Timer Scale = 127)

Parameter 16: 0 – 255 Pulse Timer Clock (High Byte)

Factory Default = 255

0-255 - Pulse timer clock that determines wind speed scale.

Values below about 250 have very long timing periods and usually result excessive rollovers of the wind speed display making it look confused.

Parameter 17: 0 – 255 Pulse Timer Scale

Factory Default = 255

0-255 - Pulse timer clock that divides wind speed scale. This value is also the maximum value of the display.

- 255 – Full scale
- 127 - 1/2 scale
- 63 - 1/4 scale
- 31 - 1/8 scale
- 16 - 1/16 scale
- 8 - 1/32 scale
- 4 - 1/64 scale
- 2 - 1/128 scale
- 1 - 1/256 scale
- 0 - Display = 0

Parameter 18: 0 – 255 Pulses Per Period Timer

Factory Default = 68

0-255 - This Parameter sets the pulse counting time period.

Factory Preset Values are...

68 MPH

108 KPH

56 Knots

100 Feet/Second

30 Meters per second

Parameter 19: 0 – 31 Oscillator Fine Tune

Factory default = 16

0-32 - This parameter adjusts the frequency of the internal oscillator of the microcontroller. Increasing value will decrease wind speed measurements. This parameter also affects the Real Time Clock, an increase in oscillator frequency will decrease the time that the latch timers are on.

0 = -12%

16= 0%

31 = +12%

Thank you – enjoy!