USB Configurable, Dual-Axis, 4-20mA Tilt Sensor

Hummingbird Electronics' dual-axis current-output tilt-sensor provides two 4-20mA outputs representing a user configurable range of angles.

Maximum flexibility for use in the widest variety of applications

Powerful Performance

Hummingbird Electronics' dual-axis current-output tilt-sensor measures pitch and roll angles with high accuracy by measuring movement relative to the earth's unchanging gravitational with a 3-axis accelerometer.

The accelerometer is calibrated for use over a -90 to 90 degree angle over a -40 to 85 degree Celsius temperature range. It is accurate to 0.1 degrees for up to 30 degrees of tilt in any axis.

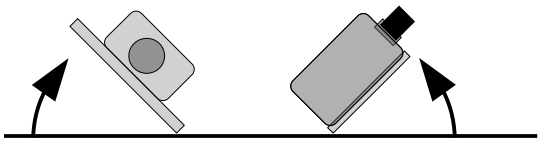
Parameters associated with the sensor such as the current scale and what range of angles it represents can be configured by the user. Further enhancements such as modification of the damping factor (how much averaging is performed) and calibration can be changed through a built-in serial interface.

Manual calibration can be performed by pressing an internal push-button inside the device can is provided. Calibration should not be used to correct for angles outside of 5 degrees.

Rugged Hardware

The configurable tilt-switches are supplied in a rugged aluminium enclosure that is splash-proof. Provision for screw mounting when required is provided.

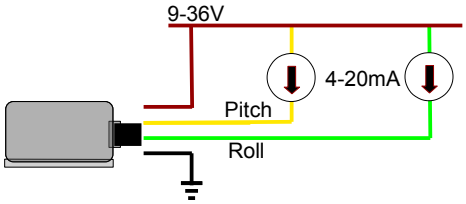
Power to the unit and outputs are provided through colour coded wires.



45 degree roll *45 degree pitch*

Connection specification

Red – Power (9-36V)
Black – Ground
Yellow – Pitch (4-20mA sink)
Green – Roll (4-20mA sink)



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Technical Specifications and Ordering Information	
Part number	HMTS6CFG0
Device type	USB Configurable, Dual-Axis, 4-20mA Tilt Sensor
Number of axis	Dual Axis, unit must be mounted level with the base plate down
Angle of operation	-90 to 90 degrees in both axis
Resolution of sensor	0.1 degrees (-30 to 30 degrees), 0.25 degrees over the full operation range
Frequency response	Minimum 0.01Hz, Maximum 10Hz. Default 0.3Hz
Input voltage range	9-36V, reverse polarity protected
Current consumption	50mA at 12V and 30mA at 24V typical
Current output range	4-20mA
Serial interface	RS232, 115200 baud 8N1
Dimensions	57mm (width) x 82mm (length) x 35.2mm (height)

Serial messages

Serial messages can be sent to the device via the internal USB plug to change the configuration. Each message must end with CR and LF (carriage-return and line-feed). The device will respond “OK” if the message was correctly received and “ERROR” if it was not.

Typical messages are:

*set output [1/2] axis [p/r] - u*sed to associate output 1 and 2 with either pitch or roll. To associate output 1 with the roll axis, use the following command:

s*et output 1 axis r*

set output [1/2] [low/high] angle [value] - used to set the range of angles being used in the application. The range of valid angles is +-90. For example, to set output 1 to operate over -10 to 30 degrees, use the following commands:

set output 1 low angle -10
set output 1 high angle 30

Set output [1/2] [low/high] current [value] - used to set the upper and lower currents that represent the upper and lower angles as specified. The range of valid currents is 0-20. Following on from the example above, to set the output current to 4mA at -10 degrees and 20mA at 30 degrees, use the following commands:

set output 1 low current 4
set output 1 high high 20

*set filter speed 1 - s*et the filter between 1 and 10, where 1-10 represent the following frequencies: 0.01Hz, 0.033Hz, 0.67Hz, 0.1Hz, 0.3Hz, 0.7Hz, 1.0Hz, 3.3Hz, 6.7Hz, 10.0Hz.

show output [1/2] – show the current settings for output 1 or 2.

show filter speed : shows which filter coefficient is currently selected. Use lower numbers to apply more damping in vibration prone systems.

show tilt – shows the current pitch and roll

reset calibration - sets the pitch and roll offsets to 0.

set calibration - zeroes the sensor at it's current position – do not attempt to zero the sensor on an angle exceeding 5 degrees.

show calibration - shows the current calibration offsets.

help – issue the help command at any time for more help. Remember that the commands must be terminated with a carriage return and line-feed.

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