



### Mounting The Unit

- The unit should be mounted in the horizontal plane.
- It can be mounted base down, or base up (inverted). See figures 1 and 2
- If the unit is not mounted perfectly horizontally any error can be removed after wiring using the zero set switch. See section below titled 'Zero Setting' for more information.
- The maximum off level (horizontal) that can be electronically corrected is  $\pm 10^\circ$  in any direction.
- However to get the best switching accuracy and to minimise the effect of temperature on the accuracy it should be installed as close as possible to the horizontal plane of the machine or equipment it is being installed on.
- The unit is mounted via the two holes on the underside of the housing. No. 6 or similar self tapping screws can fix directly into the holes through the mounting plate. See figure 4 for dimension information.
- The blind holes are only 6mm deep so it is very important to use the correct screw length.
- A right angle mounting bracket is available to enable fixing to a vertical surface, part ref ETS-RAB (figure 3).
- We do not recommend the housing is drilled to make new fixing points. Drilling can cause damage to the electronic components, and the box's seal rating will be compromised.

Figure 1 : Mounted Horizontally On Base



Figure 2 : Mounted Horizontally Inverted

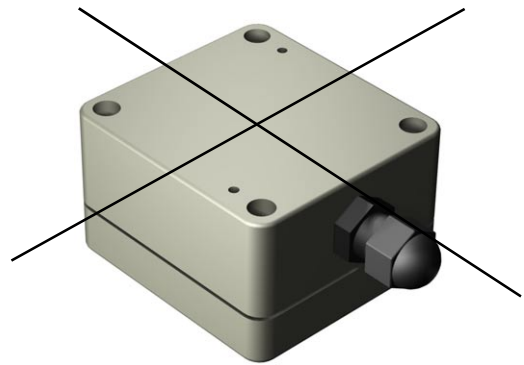


Figure 3 : Right Angle Bracket Mounting

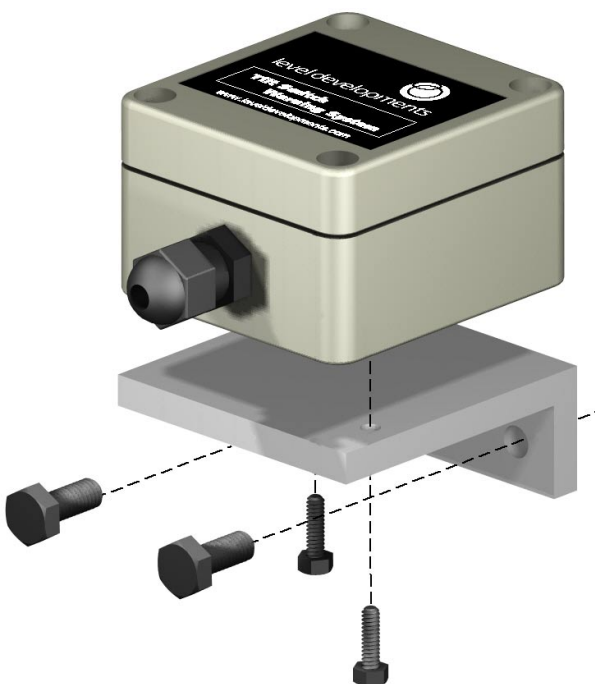
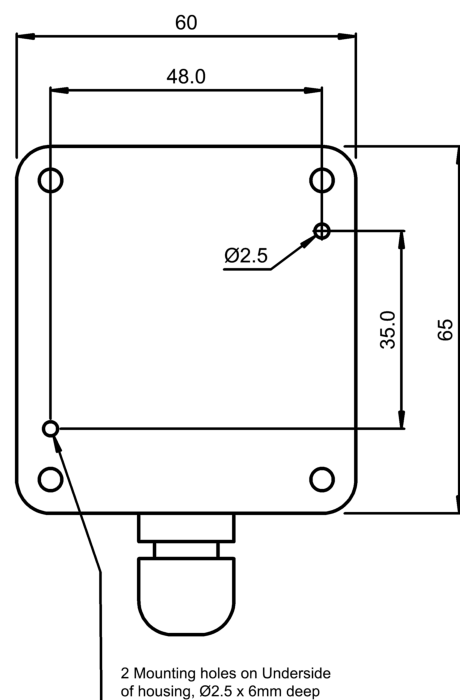


Figure 4 : Mounting Hole Positions





### Setting the Zero Position

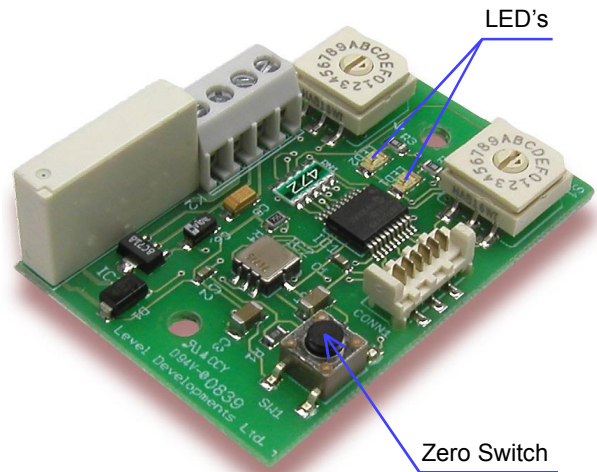
As supplied, the tilt switch will operate when the threshold angle is reached with respect to an absolute level plane.

If however the unit is not mounted perfectly horizontally any error can be removed using the zero set switch. This is a small push button switch on the printed circuit board inside the housing.

The maximum off level (horizontal) that can be electronically compensated is  $\pm 10^\circ$  in any direction, however to get the best switching accuracy and to minimise the effect of temperature on the accuracy it should be installed as close as possible to the horizontal plane of the machine or equipment it is being installed on.

The switch is accessible by removing the top cover of the housing by releasing the four screws.

Figure 5 : Mounted Horizontally On Base



- First ensure the tilt switch is mounted in accordance with the instructions on page 1.
- Position the machine or equipment in a level plane in both axis.
- Remove the top cover of the housing by releasing the 4 screws in the lid.
- Power on the unit. Once the tilt switch is powered on, wait for at least 5 seconds.
- Carefully press the small push button switch on the PCB. This is highlighted in figure 5. Care should be taken not to touch any of the other components on the PCB when pressing this switch. Push the button in and release it, do not hold it pressed down.
- After pressing, the 2 LED's on the PCB will blink to indicate that the button press has been successful.

The tilt switch stores this zero position in non volatile memory and uses the value when calculating whether or not the threshold angle has been exceeded. It will remember this even after the power is disconnected and then re-connected.

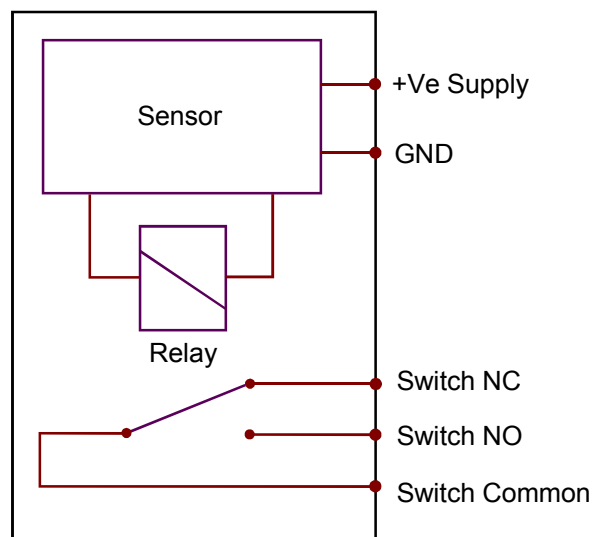
### Wiring Information

The Tilt sensor has a five wire connection. The brown and black wires are used for the power supply and the other wires are connected to the switch contacts. **The unit is not fused internally.** On a vehicle system it should be connected to a supply from the fuse box with a 1A rating, or connected using an inline 1A fuse. Please see the schematic opposite (figure 6) and the table below (table 1) for connection details.

Table 1 : Wiring Details

Wire Colour	Terminal Block Pin	Function
Blue	1	Switch Common
Green	2	Switch NO
Grey	3	Switch NC
Brown	4	+Ve Supply
Black	5	GND

Figure 6 : Wiring Schematic





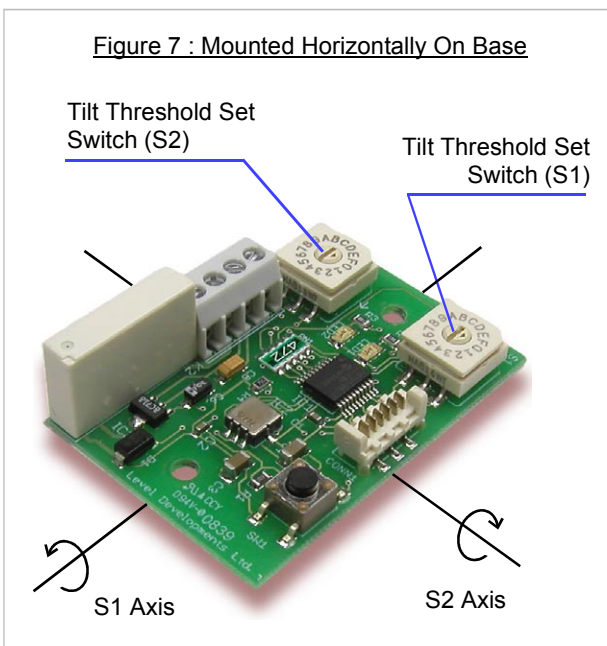
Setting the Tilt Threshold

The tilt threshold can be adjusted to set the angle at which the device will trigger. The range of adjustment will depend on the model purchased (see table). The tilt threshold is set via the small rotary switches on the PCB.

There are two switches, one which sets the tilt threshold in the X axis and one for the Y axis. For single axis and omni-directional models, only the S1 switch is used, and the S2 switch has no function. The switches are labeled S1 and S2 on the PCB (figure 7) and the arrows on this picture indicate the rotational axis which they set. For single axis units, the sensitive axis is the S1 axis. For omni-directional units, the resultant angle from the S1 and S2 axis is measured and compared with the value from the S1 switch.

The rotary switches have 16 positions labeled 0-9 and then A-F. This allows the trip angle to set with a range of 16 values between the maximum and minimum values. Table 2 details the switch position and tilt threshold value for each of the ETS models available. The switches can be adjusted with a small screwdriver.

Once set, the lid should be screwed back in position and the unit is now ready to use. In normal operation the relay will be engaged, and the switch contact closed when the angle is greater than the threshold angle in either or both axis. The relay will switch off when the angle is reduced below the threshold angle less the hysteresis value. The hysteresis is necessary to avoid oscillation at the threshold point. The hysteresis angle varies for each model, for details please consult the product data sheet.



Switch Position	Trip Angle			
	ETS 1-4	ETS 4-11.5	ETS 10-25	ETS 20-50
	1.0°	4.0°	10°	20°
	1.2°	4.5°	11°	22°
	1.4°	5.0°	12°	24°
	1.6°	5.5°	13°	26°
	1.8°	6.0°	14°	28°
	2.0°	6.5°	15°	30°
	2.2°	7.0°	16°	32°
	2.4°	7.5°	17°	34°
	2.6°	8.0°	18°	36°
	2.8°	8.5°	19°	38°
	3.0°	9.0°	20°	40°
	3.2°	9.5°	21°	42°
	3.4°	10.0°	22°	44°
	3.6°	10.5°	23°	46°
	3.8°	11.0°	24°	48°
	4.0°	11.5°	25°	50°