

Installation Instructions for Mower Tilt Switch

- 1) Before starting, the mower should be parked on level ground. This can be checked with a standard spirit level, (see pictures 1 and 2). This is necessary for the tilt switch to be correctly zeroed after installation.

Picture 1



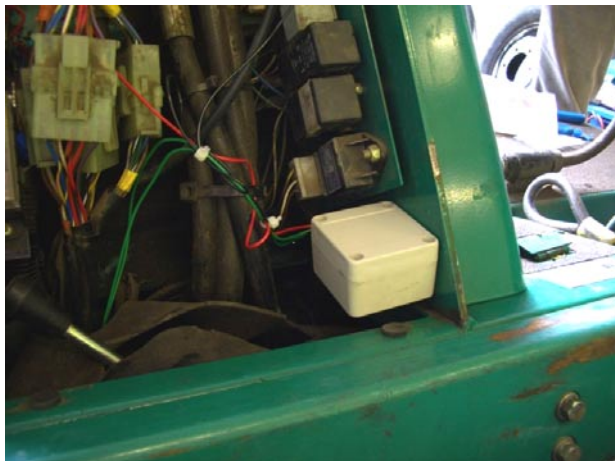
Picture 2



Mounting the enclosure

- 2) The enclosure containing the tilt switch needs to be mounted in a level plane within $\pm 5^\circ$ to give the best switching angle accuracy and to achieve the stated specifications. This is not critical, as long as it is approximately flat in both axes after mounting.
- 3) The enclosure is a sealed enclosure rated to IP65 which means that it is suitable for use outdoors. However it is best mounted in a position where it will not be subjected to any direct water spray, and not directly in the path of the grass cutting. On the Ransome machines, inside the front cowling with the other electrical components is a good place (see picture 3)

Picture 3

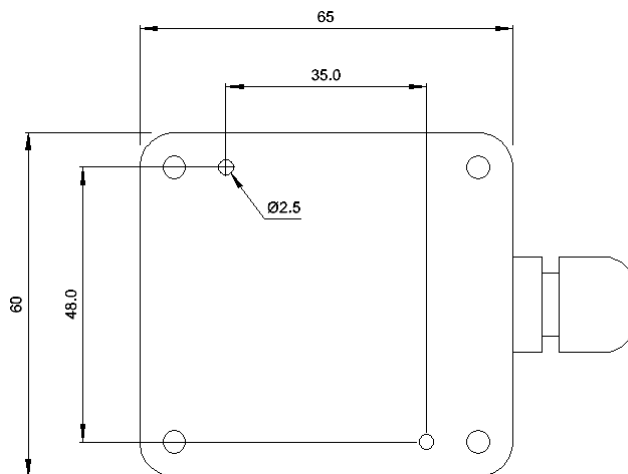


- 4) The unit is best mounted using the 2 mounting holes on the underside of the enclosure as shown in diagram 1. Use no.6 self tapping screws to a maximum depth of 6mm:

- 5) Alternatively 2 holes can be drilled in the side of the enclosure so that it can be mounted against a vertical surface. Care should be taken when drilling these holes not to damage the electronics inside the enclosure. Use 2 x M4 or M5 screws for this type of mounting. Be sure to clean out all debris from the enclosure after drilling.

Diagram 1

Bottom View



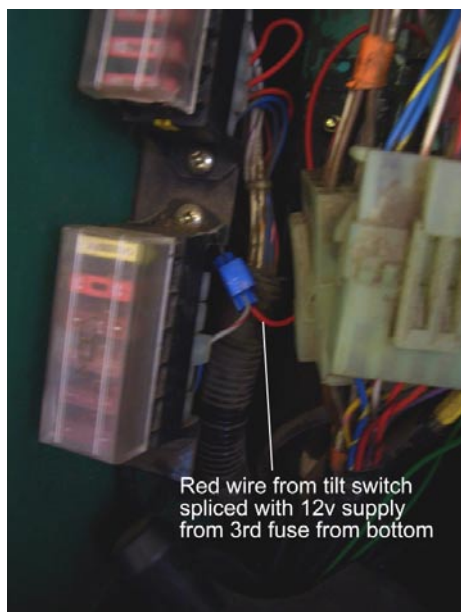
Wiring

- 6) Once mounted in position the wires should be attached. The following colour coding is used :

Red	:	+12v
Black	:	0v (Ground)
Green	:	Switch contact 1
Green	:	Switch contact 2

- 7) The red cable is the positive power supply for the device and should be connected to a fused connection from the ignition switch. On the Ransome machine this connection can be made to the 3rd fuse up from the lower bank of fuses using a splicing connector. This is shown in picture 4.

Picture 4



- 8) Black is the ground connection and can be joined to the chassis at any suitable point. **Wiring the red and black wires incorrectly may result in damage to the tilt sensor.**
- 9) The two green wires should be connected directly across the horn switch. When the unit operates these two connections are effectively short circuited and will therefore operate the horn if connected across the horn switch.

The polarity of these wires is not critical as they are only acting as switch contacts. On the Ransome machine this connection is shown in picture 5 connected across the rotor lift safety switch.

Picture 5

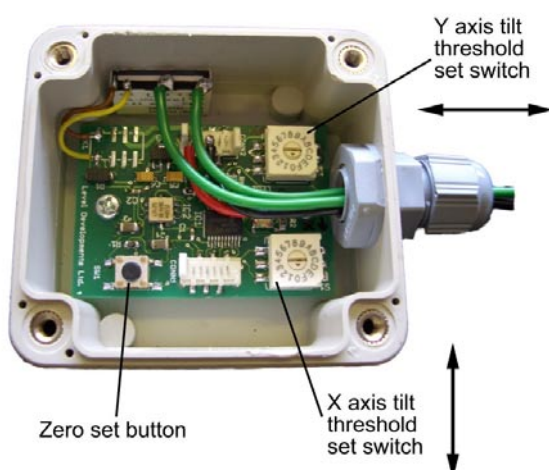


- 10) All four wires should be tied to the exiting wiring loom using tie wraps to protect them from damage, and cut to the correct length to reach the necessary contact points.

First use

- 11) Once the unit is mounted and wired, and the wiring has been checked, it is almost ready for use. Before it can be used however it needs to be zeroed so that it's zero reference is in the same plane as the machines zero reference. This is done electronically by pressing a small switch on the circuit after the unit is powered up.
- 12) Assuming the mower is still parked on level ground; remove the lid of the tilt switch enclosure by releasing the 4 screws. Switch on the ignition of the mower to power up the tilt switch. After switching on, the horn may sound, this is normal until the zero position has been reset. Wait for at least 10 seconds after power up, and then press the small button on the PCB as shown in picture 6. Press and release the button; do not hold it pressed in. After pressing, the 2 LED's will light sequentially for 1 second each to indicate that the button press has been successful. If this does not happen then press the button again.

Picture 6



















- 13) After both LED's have switched off, the zeroing procedure is complete and the unit is ready to use. At this stage the horn should not be sounding. If it is then there is a problem with the unit or the installation. In this event, please contact the manufacturer on phone number 0208 684 1400, or by email to tech@leveldevelopments.com

Setting the trip angle

- 14) Different machines have different safe working angles. This should be confirmed with the manufacturer of the particular machine before setting. The tilt switch has an adjustable tilt threshold which can be set via the small rotary switches on the PCB in the range of 10-25 degrees.
- 15) There are 2 switches, one which set the tilt threshold in the X axis and one for the Y axis. For most machines, the trip points will be the same for both axis, but this should be checked with the manufacturer. The two rotary switches are labeled S1 and S2 on the PCB (Picture 6) and the arrows on this picture indicate the axis which they set. Whether S1 controls left -right or fore-aft tilt threshold will depend on which way round the unit has been mounted, so it is important to use the arrows as shown in picture 6 to work this out.
- 16) The rotary switches have 16 positions labeled 0-9 and then A-F. This allows the trip angle to set from 10 to 25 degrees in 1 degree increments. Please use table 1 to reference your required trip angle versus the switch position. The switches can be adjusted with a small screwdriver.
- 17) Once set, the lid should be screwed back in position and the unit is now ready to use. The switch angle can be tested by driving the machine on a slope, and using a digital inclinometer mounted onto the mower to confirm the switching angle is accurate. If the unit is operating successfully, the horn will sound constantly when the operating angle is greater than the threshold angle in either or both axis. The horn will switch off when the angle is reduced below the switching angle minus 1 degree. For example if the switching angle is set to 15°, once it is tripped, it will only reset when the angle falls below 14°.

Table 1

Switch Position	Trip Angle (°)
	10°
	11°
	12°
	13°
	14°
	15°
	16°
	17°

Switch Position	Trip Angle (°)
	18°
	19°
	20°
	21°
	22°
	23°
	24°
	25°