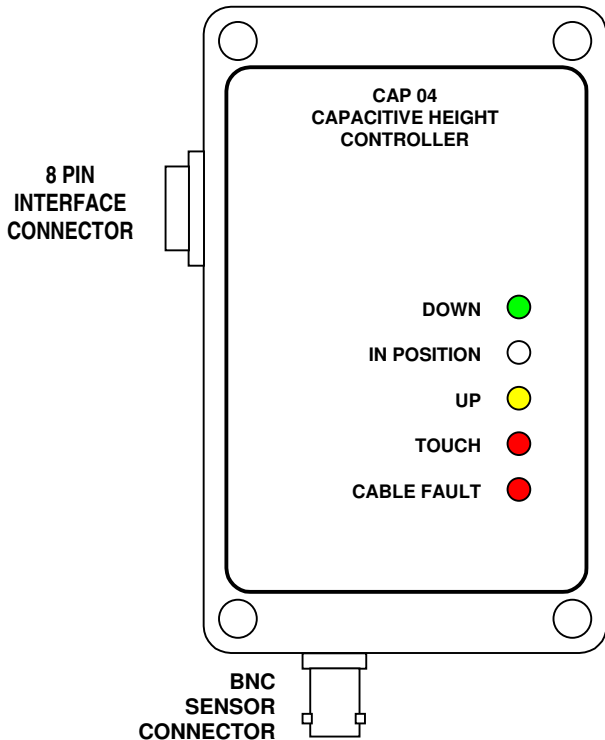


**AGELKOM CAP04**  
Plasma and Oxy Fuel Torch height control  
for sheet metal cutting machines  
Height Sensor & Controller



**Description:**  
**SENSOR RING:**

The metal sensor ring is connected to the CAP04 via a 90 cm long 75 ohms low capacitance coaxial cable. There is a 2 size for Sensor Ring. The Plasma Ring ID is 34 mm and OD is 47 mm. Sensing height of the ring should be between 1,5 to 10 mm above the plate. The Fuel Ring ID is 50 mm and OD is 69 mm . Sensing height of the oxy ring should be between 7 to 35 mm above the plate The ring must be insulated from all conductive parts of the cutting torch.

**ELECTRONICS:**

The connection of supply and outputs to the CAP04 is via 8 core screened cable. Connector can accept cable up to 6.5 mm OD diameter. The supply is nominal 24VDC and the consumption current is less than 150mA.

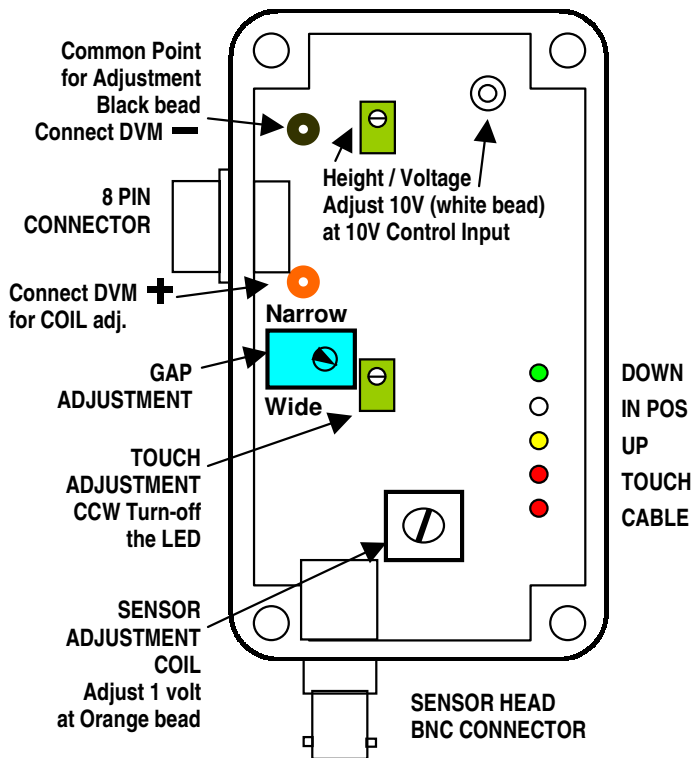
Do not use same power supply with motors.

The all outputs are at normally low, 15V level during in active and drive up to 15mA.. These outputs can directly drive LED or Opto Coupler. Due to current limiting, there is no need voltage divider for 12 and 5 volts input range of your breakout board if inputs are opto coupler isolated. Touch output can be adjusted internal trimpot as a minimum height. It allows NULLING the height, if such feature required.

Voltage Control inputs are floating, with opto- coupler isolated. Inputs can be driven 0-10V analogue output, however due to electrical noisy environment input has threshold level about 2-3V and range is 3-10V. It is also possible with external potentiometer (1K linear) as a voltage divider for adjusting the height manually.

**GROUNDING:**

The diecast box must be grounded. Usually the sensor is bolted to the housing of torch lifter and must be connected via thick wire 10mm<sup>2</sup> to System Ground to have a sufficient ground connection. Use STAR type grounding. Interface cable shield should be connected at system side.



### ADJUSTMENT:

1. Apply 10V DC to Height Control inputs. Adjust Height/Voltage trimpot until 10V reading at WHITE bead. Manually adjust the torch lifter, so the ring is about 50 mm above the plate.
2. Disable the drive system (e.g. electrically or mechanically disconnect motor).
3. Activate CAP04 and monitor up and down output. At this point DOWN (GREEN) LED must be on, if not internal coil adjustment needed. (Refer Internal Coil Adjustment Section).
4. Decrease the distance between sensing ring and plate and verify that UP (AMBER) LED is ON.
5. Disconnect BNC connector and verify that CABLE (RED) LED is ON.
6. Reconnect the drive system.

The correctly adjusted sensor should activate outputs within +/- 0.05 mm at 1.5 mm above the plate and up to +/- 0.2 mm at 35 mm. with two sensor.

### Internal Coil Adjustment: (if necessary)

1. Do not apply Height Control Voltage. This is for maximum height.
2. In Home position of your Z axis DOWN LED must be ON, if not:  
Remove the front panel. Use plastic screw driver. Gently adjust of the internal coil of CAP04 sensor and observe down output is activated in your HOME position (or sufficiently high above the plate.) If DOWN LED is activated instead of UP readjust the core of the coil.
3. Start slowly to decrease the distance between sensing ring and the plate to the cutting height of say 3mm and verify that UP LED is ON. If not, readjust the coil.
4. If you need to change the cable between the unit to sensor ring, internal coil should be re-adjusted. You can use 70 cm to 100 cm long sensor cable. The original cable length is 90 cm and the type is RG59

### Important:

**Do not turn fully CW or CCW and do not apply force to the CORE of the internal coil. The CORE is easily broken.**

### Window Adjustment:

There is small amount of GAP (window) between UP and DOWN. Also GAP could be adjusted with internal trimpot. Turning CW of trimpot makes gap wider. Increased cutting height will result in a wider the GAP.

### Touch (Down Limit) Adjustment:

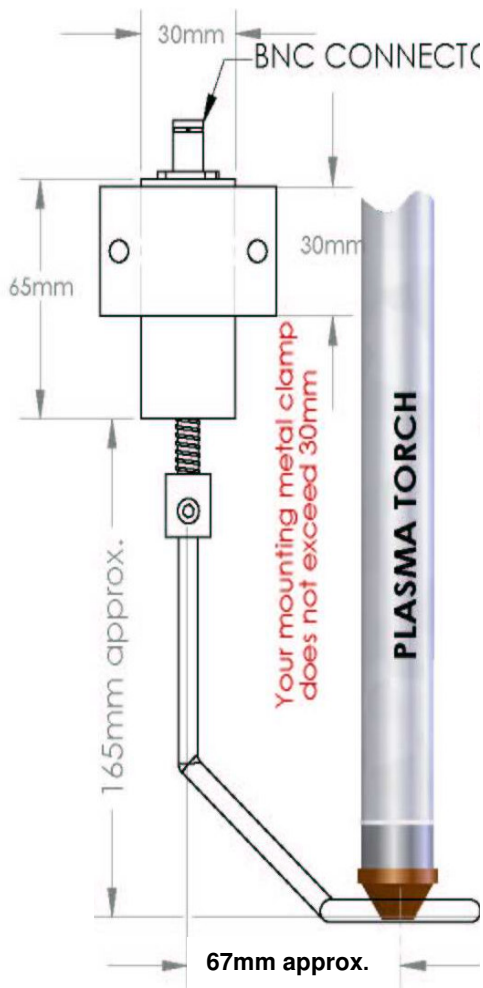
After all adjustment was finished, you can start to adjust Down Limit potentiometer, adjust this multiturn trimmer potentiometer (turn CCW) until TOUCH LED is OFF Afterwards, close the sensor ring until it touches the plate or insert paper between sensor ring and plate (cutting material). Turn CW until TOUCH LED is ON

### APPLICATION:

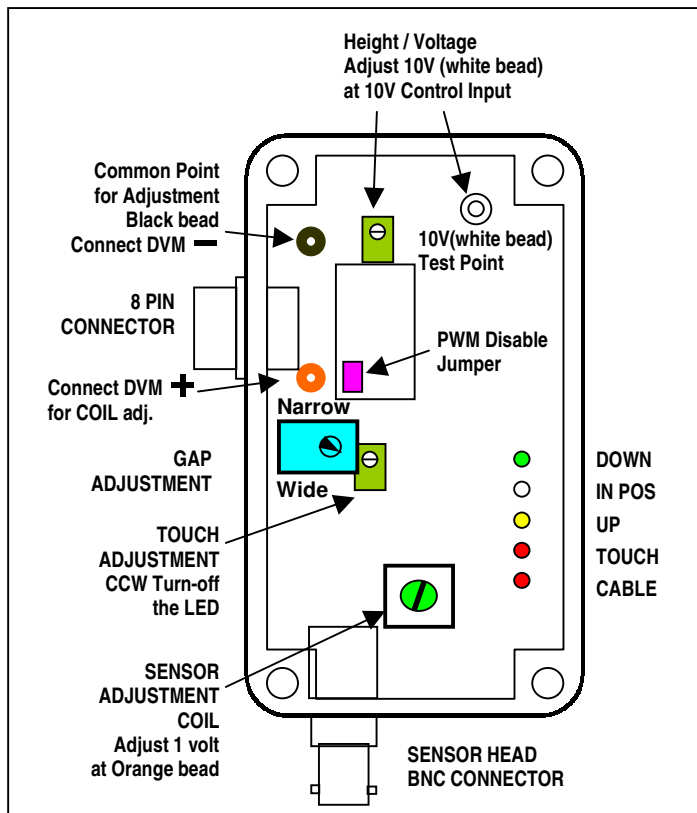
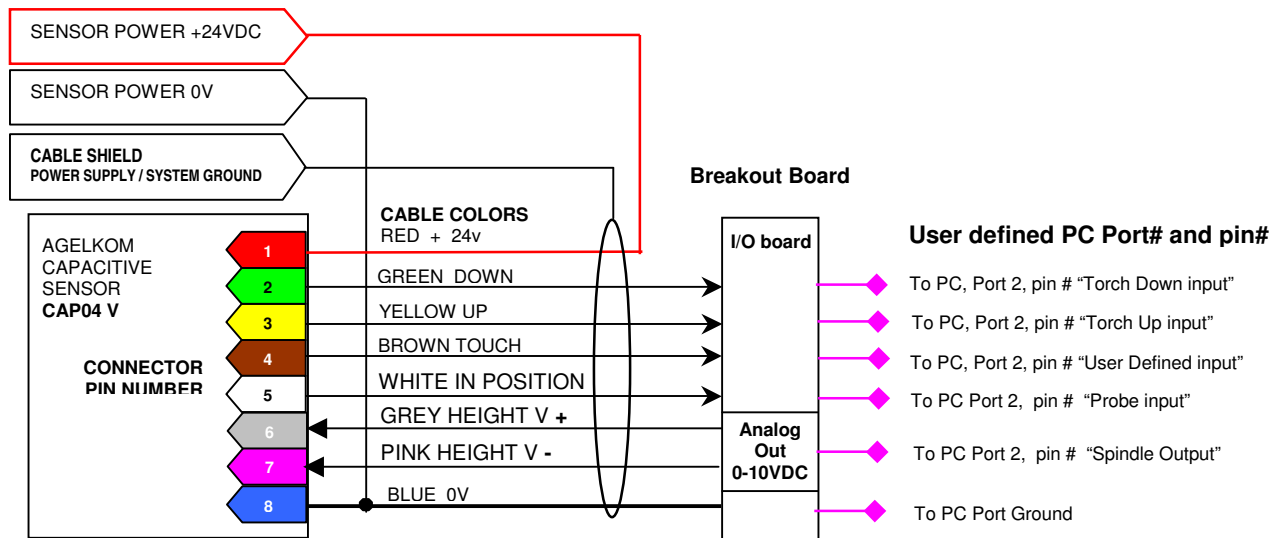
During plasma cutting, sensor ring and plasma torch are in the same height. This will allow to use TOUCH output as a collision detection means. If any fault occurs, the UP output activate automatically.

During thick plate cutting, dross may touch the sensor ring and the torch head lifted. To avoid this situation correct your cutting parameters for less dross.

CAP04 can be used with voltage controlled Height Control System. The two systems are OR'ed.



Simplified typical connection of CAP04-V shown below.



Height Control Input is floating against ground loop problem.

Adjustment procedure as follows:  
 Apply these input 10VDC and adjust trimmer potentiometer until to read at WHITE BEAD about 10V. Reduce control voltage about 3 volts and measure 13.67V at same test point. Between 0 to 3Volts, controlling is disabled for the noise margin. If no voltage applied, the same voltage appear about 13.67V. This is the Maximum Height Level

All adjustment made at factory. Please do not change until it is necessary.

**Technical Specifications:**

- Supply: Nominal 24VDC 100mA, Max: 30VDC Min: 18VDC
- Current: Less than 100mA
- Protection: Against supply reverse voltage.
- All Outputs: Normally high at 15V, 15mA with current limiter resistor.  
Can be drive opto-coupler directly
- Sensor Cable: 90cm Length, Type RG59

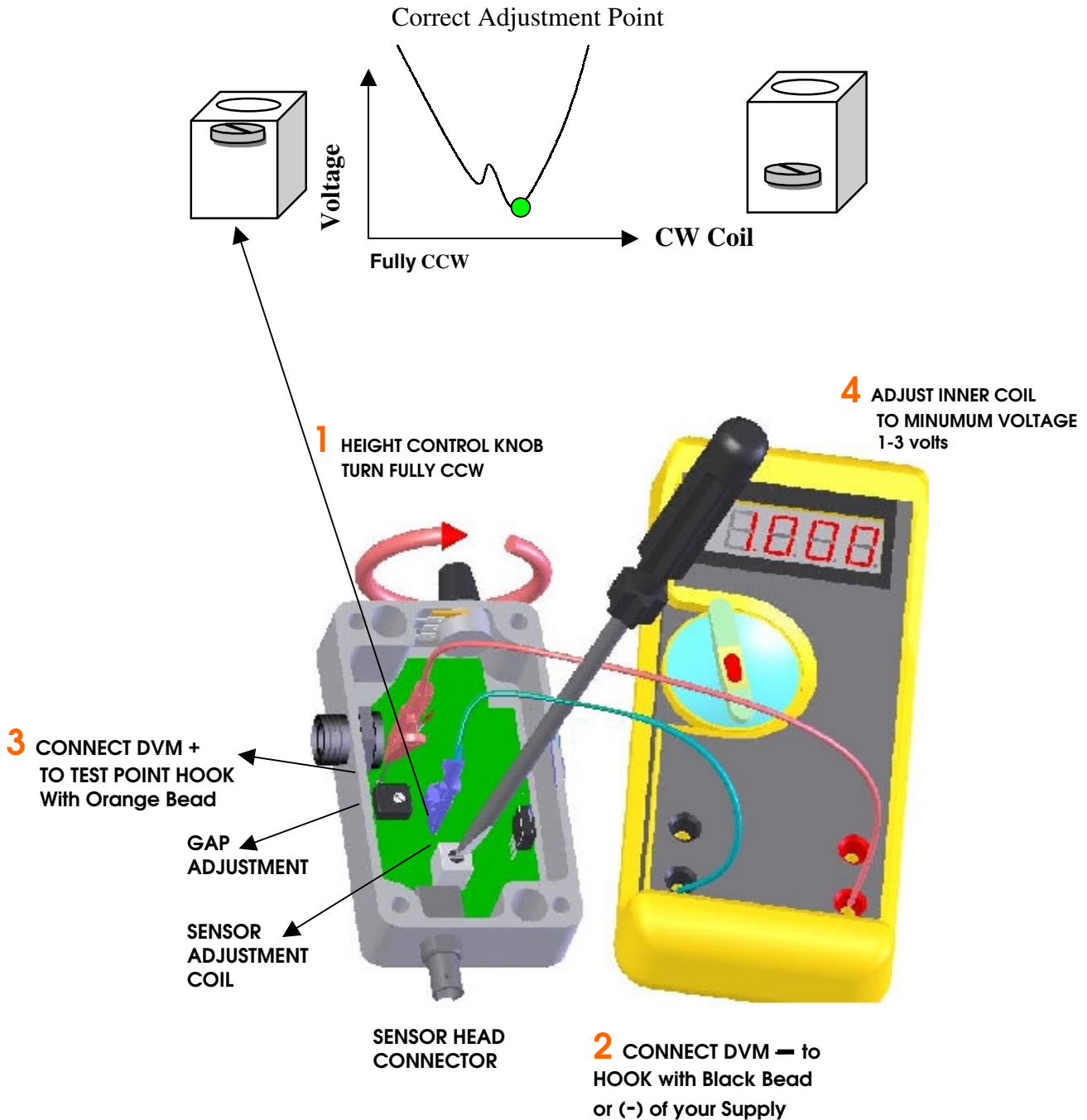
Internal Coil Adjustment:

Mount CAP04 and Sensor Head with Sensor Ring to your machine.

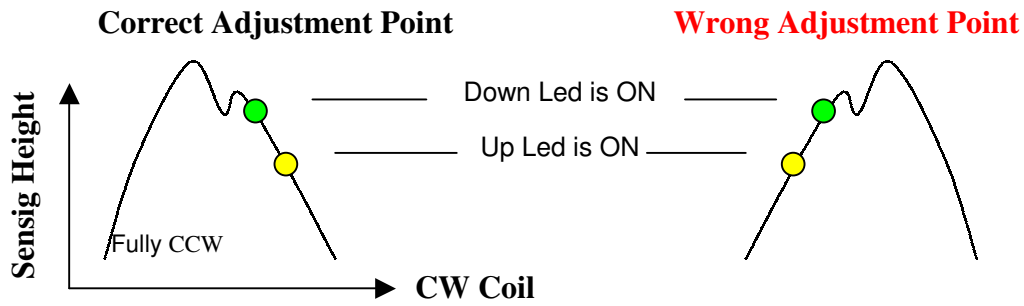
Keep Sensor Ring to Working Plate distance at maximum (at least 10cm).

**Important:**

**Do not turn fully CW or CCW and do not apply force to the CORE of the internal coil. The CORE is easily broken. Use plastic screw driver.**



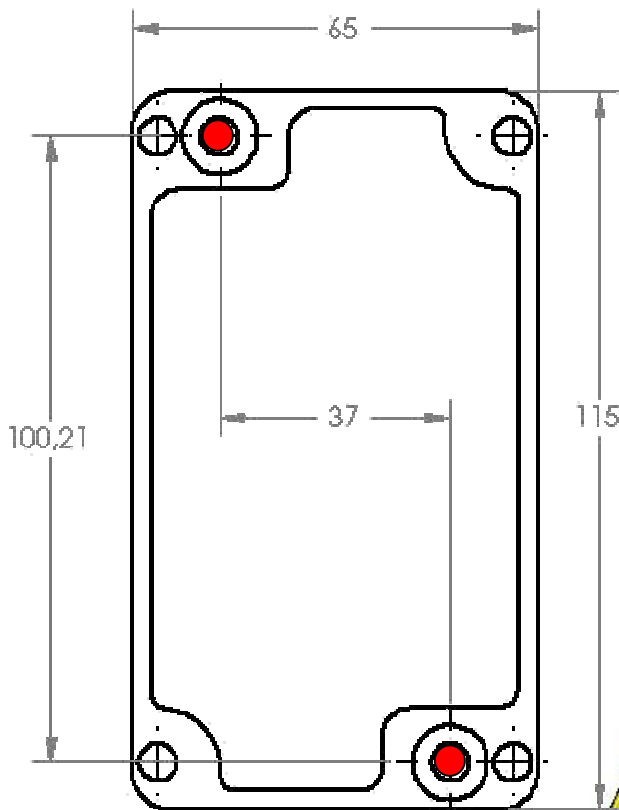
Smoothly close some metal plate (say 20cm x 20cm) to sensor ring and observe that voltage increase (never decrease) come to closer.



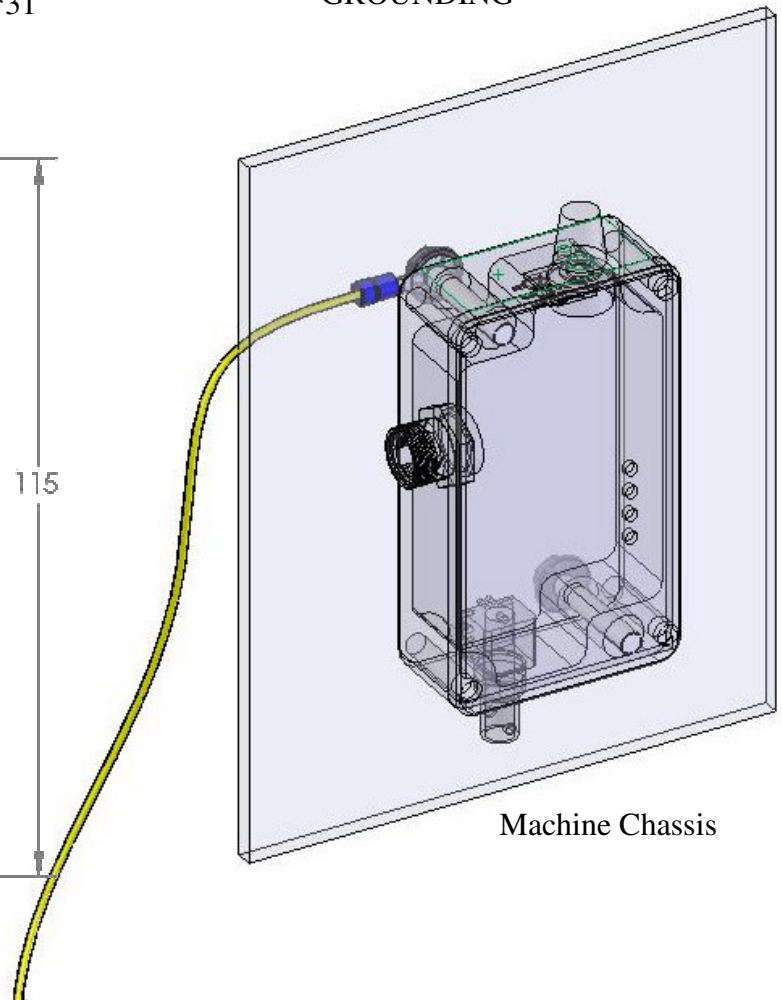
**MOUNTING**

Dimensions are in **mm**. Case Size 116\*65\*31

Two mounting holes are shown in **red**



**GROUNDING**



To System & Power Supply Box  
 Use STAR type Ground Connection  
 Use thick wire (10mm<sup>2</sup>)



## Mounting Details

