TRAIL TECH ®

VAPOR
QUICK-START

1. POWER OVERVIEW

Vapor operates on the internal 3.0V watch type battery (#CR2032). If possible, install Vapor to the vehicle's electrical system. Wiring to the vehicle enables a brighter backlight, longer sleep timer, and enables the shift and temperature indicator LED's. Vapor is polarity independent and has safeguards to avoid draining the vehicle battery. See the POWER CONNECTION section for more info.

Included Handlebar Mount

Aluminum Protector Mount (optional)

2. MOUNT VAPOR:

Vapor is made to be bolted to the vehicle. Use the included handlebar mounts, or refer to the manual or www.trailtech.net for other options like the CNC aluminum protector.

3. VEHICLE SENSORS:

Refer to the sensor installation sections. You should install the wheel sensor, ignition sensor, engine temperature sensor, and vehicle power connection.

Power Wire

Tach Ignition Sensor

Temperature Sensor (varies)

Wheel Speed Sensor (varies)

4. TROUBLESHOOT ERRATIC TACH:

See the TACH IGNITION SENSOR section for more information. If everything is working, but the tach is way off, then there's too much "ambient electrical noise", or the tach sensor is installed incorrectly.

1. Try wrapping the tach sensor around the spark plug wire more or less times.
2. Avoid routing wires alongside other high-voltage wires that may cause noise interference.
3. Some kits include a "resistor tach sensor". If there's a lot of tach noise at a certain frequency, the resistor may filter and smooth it out.

5. INDICATOR LIGHTS:

Vapor has two colored LED lights at the top. They are activated when tach or temperature goes above the thresholds to warn you about potential problems with your vehicle. The left LED is yellow, the right LED is red. When the tach is over the rev limit the LED will flash, if the temperature is high then the LED will turn on solid. Set custom thresholds in the DATA SETTING MODE. Set the thresholds to 0 to turn them off.

6. SLEEP MODE:

If Vapor sees no activity (either wheel movement or a button press) for 5 minutes, it will enter sleep mode and only display the clock. Sleep mode will end when any activity is noticed. During sleep mode Vapor is using the internal battery and will not draw down vehicle power.

TRAIL TECH® VAPOR
QUICK-START

7. BUTTONS:

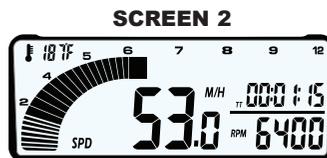Vapor has three screens. Press MODE to toggle between them.

YELLOW LED

RED LED

RESET TRIP DATA:
<LEFT> + <MODE> = HOLD TO RESET VALUES FOR:
Max Speed, Distance, Ride Time, Stop Watch, Max Engine Temperature, and Max RPM.

LEFT BUTTON
Start stop watch

MODE BUTTON
Switch screens
Hold to edit trip distance

RIGHT BUTTON
Toggle between
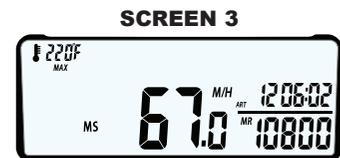screen features

8. SCREENS:

Vapor has 3 screens, press MODE to cycle between screens. Press RIGHT on screen 2 to toggle Ride Time/Stop Watch. Press RIGHT on screen 3 to toggle Odometer/Accumulated Ride Time. Hold all three buttons to enter data setting mode.
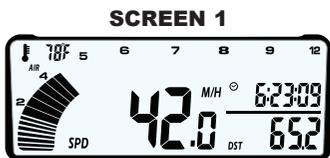
SCREEN 1	SCREEN 2	SCREEN 3
• Time of Day	• Engine Temperature	• Maximum Temperature (MAX)
• Ambient Air Temperature	• RPM Bar Graph	• Accumulated Ride Time (ART)
• RPM Bar Graph	• Stop Watch (TT)	• Odometer (ODO)
• Speed (SPD)	• Ride Time (RT)	• Maximum Speed (MS)
• Distance (DST)	• Speed (SPD)	• Maximum RPM (MR)
	• Revolutions per Minute (RPM)	

9. DATA SETTING MODE :

HOLD DOWN ALL 3 BUTTONS to enter data setting mode. Adjust one setting at a time, then move on to the next one.

<LEFT>   = Scroll value.
<MODE> = Move to next data setting screen.
<RIGHT> = Move to next digit in data setting mode.

ORDER OF SETUP MODE:

1.	Speed and Distance Format	*M/H or KM/H*
2.	Wheel Size	*See MEASURE WHEEL SIZE section*
3.	Time Format	*12H or 24H*
4.	Time of Day	*12:00:00*
5.	PPR Pulses per Revolution	*0.5, 1, or 2*
6.	PPR Pulse Change	*RPM when PPR changes*
7.	PPR Level 2	*0.5, 1, or 2*
8.	Temperature Unit of Measure	*°F or °C*
9.	Temperature Indicator	*Yellow Indicator*
10.	Temperature Indicator Danger	*Red Indicator*
11.	RPM Shift Indicator	*Yellow Indicator*
12.	RPM Shift Indicator Danger	*Red Indicator*

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POWER AND TACH SENSORS
INSTALLS

POWER CONNECTION:

FOR USE ON 6-400 VDC/VAC SYSTEMS ONLY!
Vapor will operate in the range of 6-400 VAC/VDC, but will not draw enough power to drain a vehicle battery. Use a volt meter to confirm 6-400 VDC/VAC. Vapor is polarity independent, so it cannot be installed backwards.

Fuse: Introducing a fuse into the circuit before electronics is always a good idea. ***Use a 1 amp fuse with Vapor (not provided).***

System Tap: It is possible to tap into the vehicle electrical system anywhere in the circuit. Possible points are at the lights, ignition, or CDI. When tapping into the electrical system, connect to a circuit protected by fuse.
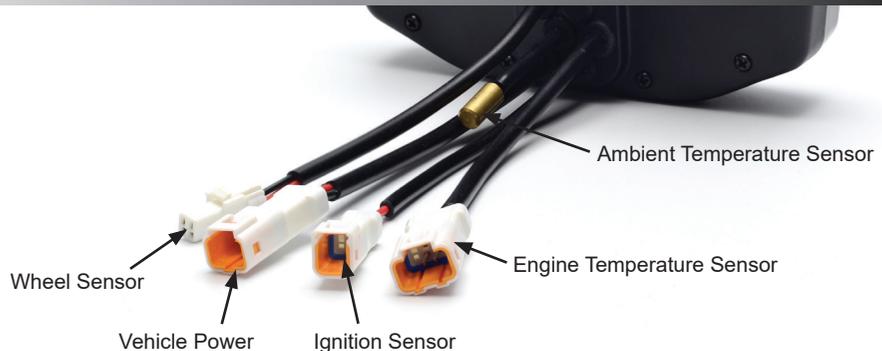
MX Bikes: Most do, but some motocross bikes do not have 12 volt power. If there is no vehicle battery or capacitor, connect power wire to ignition power leads from stator. Use caution, as this is a high voltage option.

BATTERY 12 VOLT

Power Wire
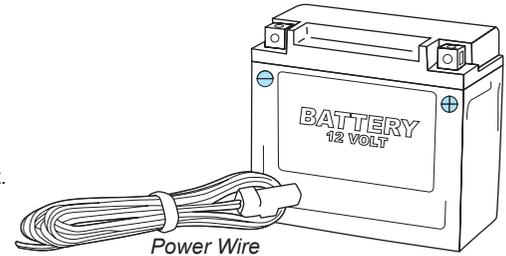
SENSORS:

The Vapor sensors plug securely into Vapor using waterproof connectors.

They are different sizes (you cannot plug a sensor into the wrong connector.)

Ambient Temperature Sensor
Engine Temperature Sensor
Wheel Sensor
Vehicle Power
Ignition Sensor
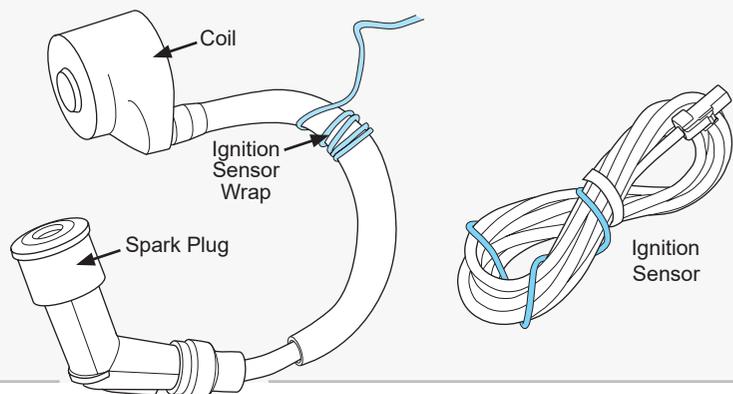
TACH IGNITION SENSOR:

The ignition sensor enables tachometer readings and the animated bar graph of Vapor.

OPTION 1: (Preferred option for most vehicles.)
Capacitive coupling to spark plug wire:
1. To install ignition sensor wire, wrap the red part of the sensor wire around the coil wire 5 times.
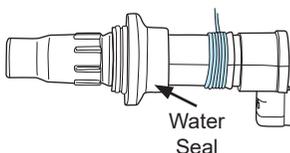
If required, you may shorten the length of the ignition sensor. Be very careful when stripping back the black casing to avoid damaging the inner red wire.
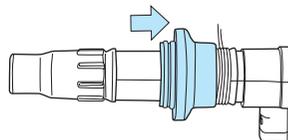

Coil
Ignition Sensor Wrap
Spark Plug
Ignition Sensor

OPTION 2:
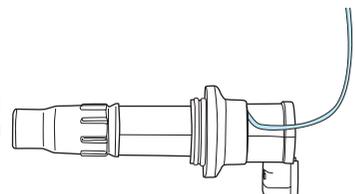If the coil is attached to the spark plug, then wrap the sensor like this:

Step 1: Pull water-seal down. Wrap ignition sensor around spark plug.
Water Seal
Step 2: Replace water-seal.
Step 3: Reinstall spark plug into motor.

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TEMPERATURE SENSOR
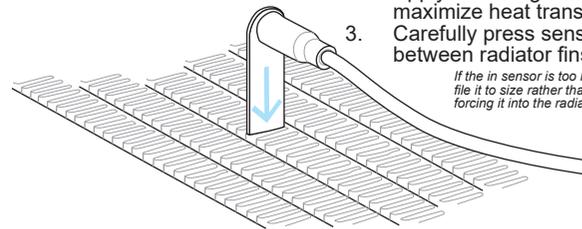## INSTALLS

TEMPERATURE SENSORS:

Most Vapor kits contain a model-specific temperature sensor. Installing the temperature sensor enables temperature readouts on Vapor. Alternative sensors are available.

Vehicles cooled with water use sensors to measure the fluid temperature, while air-cooled machines take the cylinder head's temperature at the spark plug. The radiator fin sensor is the easiest installation for water cooled applications.

Radiator Fin Sensor Installation:

1. Confirm correct size.
2. Apply thermal grease to maximize heat transfer.
3. Carefully press sensor between radiator fins.
   If the in sensor is too large, file it to size rather than forcing it into the radiator.

Radiator Hose Sensor Installation:

1. Drain fluid.
2. Measure inner diameter of hose *before* cutting.
3. Mark hose.
4. Cut hose.
5. Slide on hose clamps.
6. Install sensor & tighten hose clamps.

Tighten

Mark & Cut
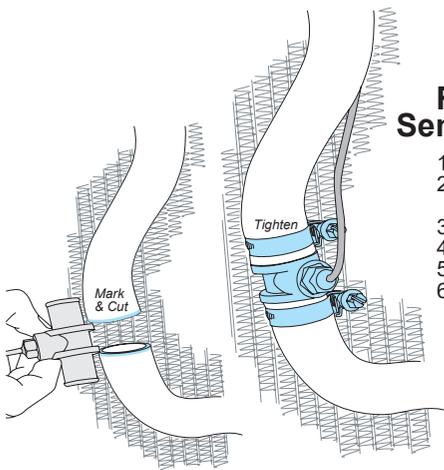
CHT Cylinder Head Spark Plug Sensor Installation:

1. Remove crush washer from spark plug.
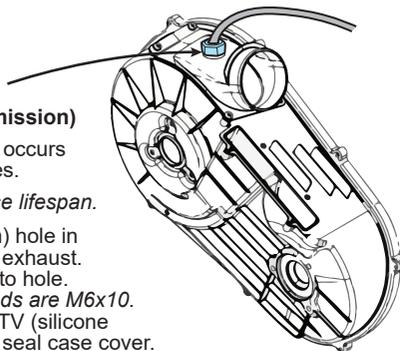2. Replace with temperature sensor.
3. Re-install spark plug.

Sensor replaces crush washer
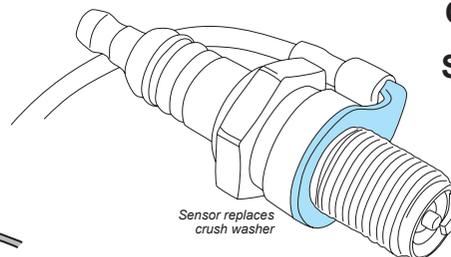
CVT Sensor Install:
(Continuously Variable Transmission)

200ºF+ Warning: CVT Belt wear occurs more rapidly at high temperatures.

Let the belt cool down to increase lifespan.

1. Drill 13/64" (5mm) hole in hard plastic CVT exhaust.
2. Thread sensor into hole.
   The sensor threads are M6x10.
3. Use high temp RTV (silicone gasket sealer) to seal case cover.
   Not included in kit.

Screw Sensor Installation:

1. Remove radiator pressure relief bolt.
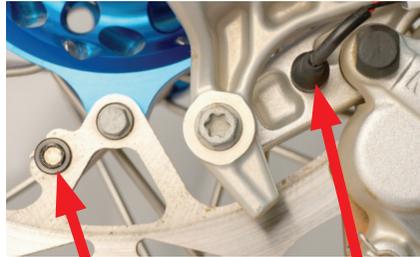2. Replace with temperature sensor.
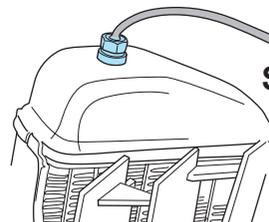
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WHEEL SENSORS
INSTALLS

KTM WHEEL SENSOR

Trail Tech wheel sensors work with the KTM and Husqvarna OEM install location.

Screw the wheel sensor into the OEM caliper position. Insert the black magnet into the pre-drilled hole in the rotor and secure with the retainer clip.

KTM Magnetic Retainer   KTM OEM Wheel Sensor Position

CONVENTIONAL FORK SENSOR

If the fork is close to the brake rotor, then the VHB fork sensor can be used. Peel and stick the sensor to the fork.

Try to have the tip of the sensor about 1/2 inch away from the magnet in the rotor.
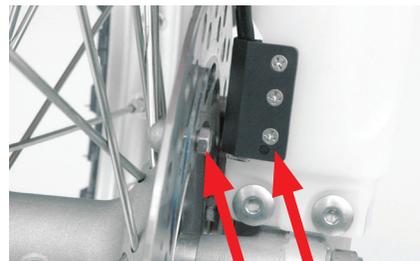
Rotor Bolt Magnet   Conventional Fork VHB Wheel Sensor

INVERTED FORK WHEEL SENSOR

If there are fork guards next to the brake rotor, then the fork guard wheel sensor can be installed as shown.

Try to have the tip of the sensor about 1/2 inch away from the magnet in the rotor.

Rotor Bolt Magnet   Inverted Fork Wheel Sensor

ROTOR SHIELD WHEEL SENSOR

For UTVs and quads with a rotor shield, position the sensor there.

Drill a 3/8" hole and use the jam nuts to secure the sensor to the rotor shield. Use loctite rather than over-tightening the jam nuts.

Rotor Shield Wheel Sensor

BRAKE CALIPER WHEEL SENSOR

Some ATVs require mounting the wheel sensor directly to the brake caliper.

Drill a 1/8" hole through the caliper mount, then use the self-tapping screw to secure the sensor.
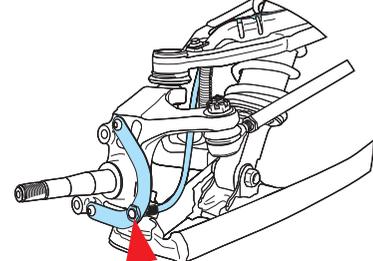
Brake Caliper Wheel Sensor

C-BRACKET WHEEL SENSOR

Some kits include a metal C-bracket to help mount the sensor, as shown.

Use the jam nuts to secure the sensor to the C-bracket. Use loctite rather than over-tightening the jam nuts.

C-Bracket Wheel Sensor

MAGNET INSTALLATION:

Install a magnet on the brake rotor to trigger the speed sensor each wheel rotation.

Remove one of the stock rotor bolts and install the magnetic rotor bolt as shown, do not overtighten past 10 ft-lb of torque. If the magnetic bolt will not work, the kit includes a spare magnet that can be installed into one of the rotor spaces. Use the included retainer clip or epoxy such as JB Weld to secure.

Magnetic Rotor Bolt   Magnetic Retainer or Spare Magnet

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WHEEL SENSORS
SETUP

WHEEL SENSOR TEST:

Test for correct sensor/magnet placement before permanently mounting.

1. Set the vehicle on a stand so that the front (left) wheel spins easily.
2. Plug the wheel sensor cable into the computer.
3. Install the magnetic bolt.
4. Hold the sensor in place on the caliper mount by hand. While someone watches the computer, roll the wheel. If the computer does not register, move the magnet or sensor and try again. There should be 1/2" or less gap between the sensor and magnet.

Do not mount so that the magnet passes the middle section of the sensor. Either the sensor will not register at all; or the sensor will register twice, causing a "double trigger" effect (computer displays twice the true speed.) If a double-trigger is unavoidable, divide the wheel size setting in the computer by 2 to correct the problem.
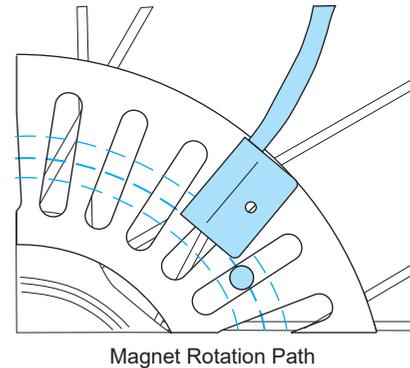
Magnet Rotation Path

MEASURE WHEEL SIZE:

Knowing your exact wheel size it critical for the wheel sensor to calculate correct speed and distance data.

When comparing calibration to GPS data, use a long straight section of road with no tight corners or small vertical movements.

Wheel Size =
Wheel Diameter(mm)
x3.14

Method 1: Ruler
Find the circumference of front wheel by measuring its diameter in millimeters. Multiply the Wheel Diameter by 3.14. The result is your wheel size.

Diameter
x3.14

Method 2: Rolling
On a flat surface, mark the tire sidewall and the ground with a marking pen. Roll the wheel until the mark on the tire completes one revolution and is back on the ground. Mark the ground at this location. Measure the distance between the marks on the ground in millimeters (multiply inches by 25.4 to convert to mm). Use this number for your wheel size. For accuracy, the rider's weight should be on the bike when making the measurement.
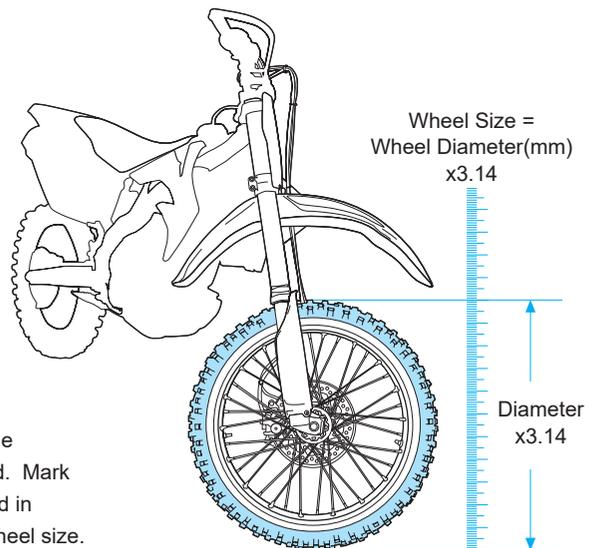
Method 3: Distance Measurement
This is the most accurate method.
1. Set the wheel size to 2110mm (motorcycle) or 1675 (ATV).
2. Find a length of road where the distance is known.
3. Ride the distance, noting how far the computer reads (i.e. the road is known to be 5 miles and the computer shows 4.95 miles.)
4. Use the numbers to solve for X in the following equation:

$$(\text{new wheel size}) = \frac{(\text{actual miles}) \times (\text{current wheel size})}{(\text{current miles})}$$

$$X = \frac{5 \times 2110}{4.95} \quad \Rightarrow \quad X = \frac{10550}{4.95} \quad \Rightarrow \quad X = 2131$$

Generic/Average Sizes:
Motorcycle: 2110 mm
ATV: 1675 mm

Wheel Size:
Enter the number you calculate from one of the above formulas into setup mode.