Cadenceur / tripmaster CT512 V3.10

1. Installation

1)Install the CT512 on the vehicle dashboard.
2) Place the probe in place (see the probe connection chapter).
3) Power on CT512 + 12v (see chapter connections).
4) Calibrate the cadence according to your vehicle (see the calibration chapter).

Note: The device does not contain an electric battery.

Observe the polarity on the connection terminals as this may destroy the device.
The device is switched on via a two positions switch on the left side.

When the unit is switched on, the device displays the last nominal value (km / h theoretical) used before it was switched off.

2 operating modes are available:

It is possible to switch from one to the other

1) Tripmaster mode: "**TRIP**" mode is displayed on the left display, display from right to top to give the distance traveled since last reset (partial distance display.) On the last display (bottom right) The distance totalized since the last start (attention it is necessary to have carried out a calibration before)

2) Timing mode "**CAD**" by giving the average speed set point the device delivers the theoretical distance traveled as a function of time (the display is updated every second) and the total distance traveled if a probe is wired.

In these two modes it is possible by switching the "AVANCE" button to "RECUL" to turn back. (Counting the impulses on the wheel).

Rq: Always switch the unit on with the switch set to "**AVANCE**".

2. General information:

Respect the supply voltages, protect the cables on their path and in the corners protect the cutting edges which can during the vibrations cut the cables and create short circuits.

Electrical connection of the power supply:

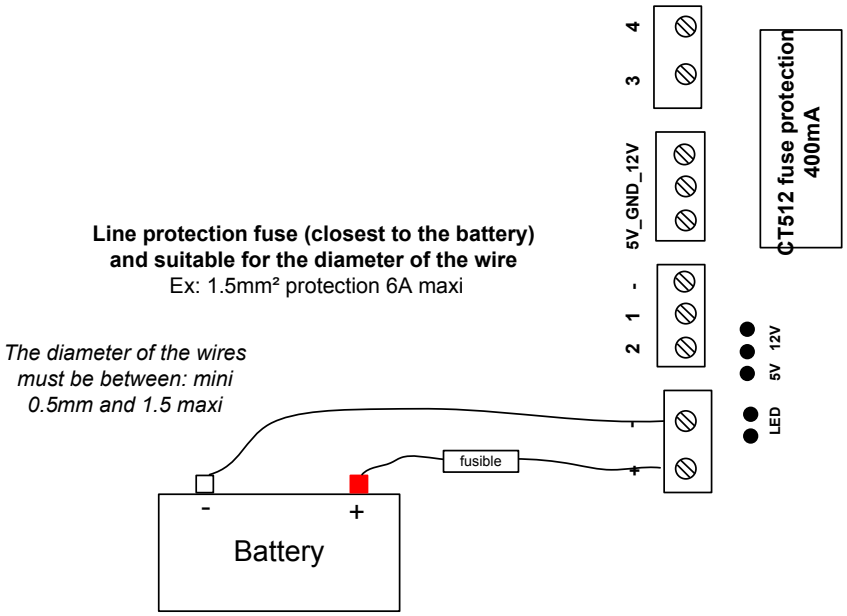
Supply Voltage Min: 8V (with probe 5V only)
Max. Supply voltage: 15v (Warning : the supply voltage goes directly on the probe).

Protection: The CT512 is equipped with a fuse (400ma), but it is necessary to protect the supply line of the housing from the voltage source with a fuse suitable for the section of the power cable and greater than 400ma. A reverse polarity protection on the power supply protects the device.

Battery: The vehicle battery may be used but it is preferable that the housing is connected to a different voltage source to ensure non-disconnection.
Battery life:
The power consumption is 260mA. Autonomy is calculated as follows:

(Battery current (Ah)) / 0.26 = time in hours.

Example: a new 7Ah battery can power the case for 26 hours ....



Risks when handling a battery: burning, splashing of molten metal.

When disconnecting the battery always unplug the "-" (minus) lead in first operation and then the "+" (plus) terminal when connecting the battery always start with the "+" (plus) terminal and then terminate By the "-" ((minus)).
Caution: use on a cigarette lighter socket presents the risk of a bad contact with the plug and an initialization of the cadenceur !! Therefore strongly discouraged.
Be careful to keep the CT512 away from the system, as electronic components generally tolerate the presence of a magnet in their environment.
Power Quality: Use with a non-battery power source must be performed with a continuous source of quality, switching power supplies may cause trouble on the displays.

3. MANUEL CADENCEUR / TRIPMASTER

The different modes of operation:

- ***Mode cadenceur without probe***: an average speed is defined and validated, every second the display gives the theoretical distance traveled at the indicated time (CAD mode) (The real km display remains at zero).

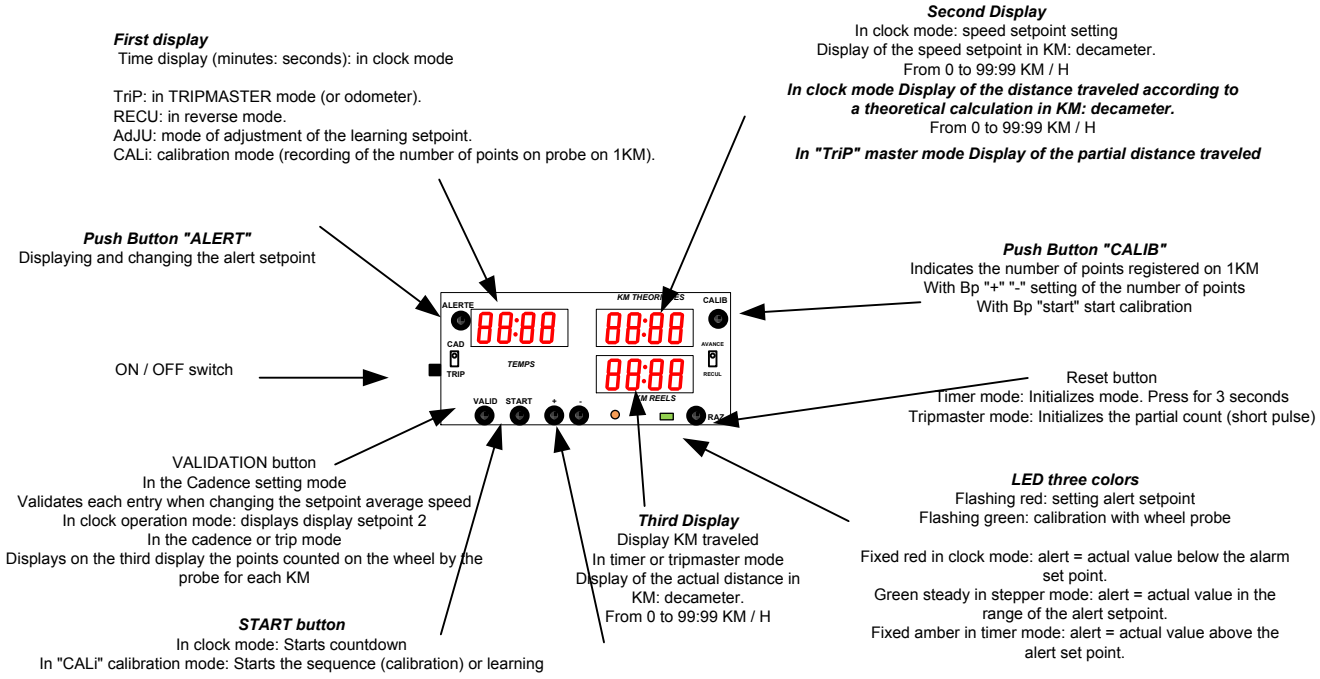
-Measurement mode with probe: an average speed is defined and validated, every second the display gives the theoretical distance traveled at the indicated time, this is compared with the actual value a led indicates by its color the difference between the speed Theoretical and real (it is possible during a journey error to count down the distance traveled). RETURN mode).

- ***Tripmaster mode***: gives the distance traveled only (button on TRIP position) with a partial display and a totalizer display.

- Alert setting mode defines the order between the actual speed and the theoretical speed, the led indicates by its color the overrun of the order (3 colors). It is possible to adjust from 0 to 99.99km the alert threshold in addition and less.

- Calibration mode: to set the actual value on the wheels, place a sensor and then traverse the distance of 1KM. (You can also use the calculation and adjust the values).

- Calibration adjustment mode: it is possible to modify the value recorded in calibration to adapt it.



4. Timing (cadenceur) mode

Cadence Mode
The cadence mode allows you to run regularity races.

The "**CAD / TRIP**" switch to the "**CAD**" position

When power is applied by the slide switch on the left side "**ON / OFF**", the last order is displayed on the display unit No. 2, the other displays are at "0".

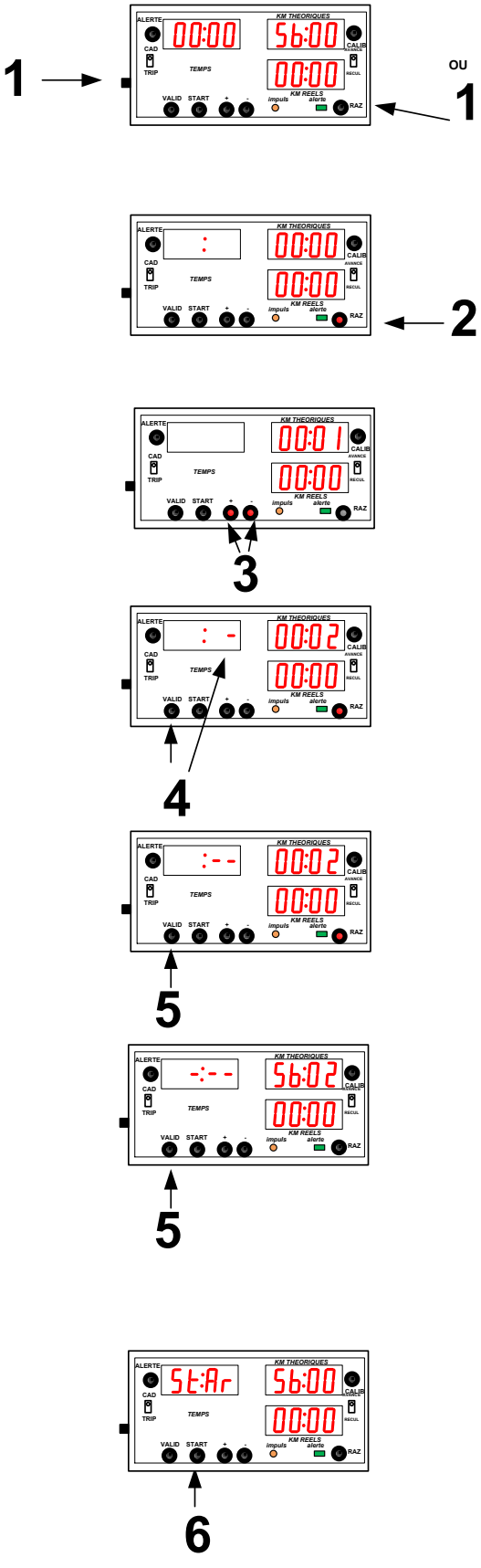
2 choices are available:

- Validation of the order by pressing "**VALID**" and starting the count down by pressing "**START**".
- "**RAZ**" to enter a new order.

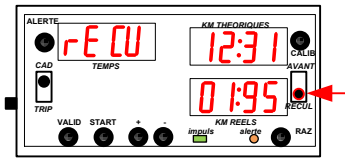
After entering the new speed order or confirming the displayed order, pressing the BP "**START**" starts the time counting, displaying the theoretical distance traveled and counting the actual distance.

Note: At any time you can switch to "**TRIP**" mode and return to "**CAD**" mode. The two points on display 1 indicate the function of timer mode.

a. Changing the speed order (with automatic recording).

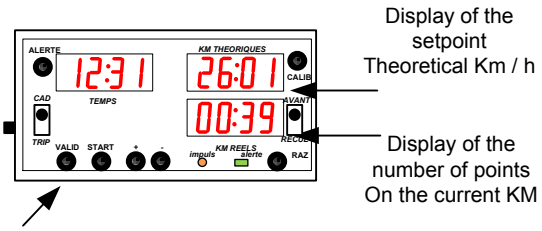


b. Mode back



To exit back mode, return to the "**AVANCE**" position.
When the vehicle makes a return following a path error and wants to count down this distance.

c. Display mode (during operation)



Press push button" **VALIDATION**" in clock mode

5. trip master only:

The tripmaster (or odometer) mode allows you to run distance races. Two values are displayed, one giving the distance traveled since the last start: totalizer, the other giving the distance traveled since the last pression the "RAZ" key .

1) Following commissioning

2) The "CAD / TRIP" switch to the "TRIP" position
When switching on the slide switch on the left side "ON / OFF", display # 1 displays "triP", the other displays are at "0".
During the movement of the vehicle, pulses are sent to the displays 2 and 3, indicating the distance traveled.

3) When the BP "RAZ" is pressed, the intermediate distance is reset.

Note: At any time you can switch to the "CAD" mode and return to "TRIP" mode if the two points on the display 1 are flashing.

Caution: Reset (Bp "reset") in the timer mode resets the totalizer and partial counters to zero.

The sensor on the wheel is connected, it is not desired to use the timer.

WARNING: sensor calibration must have been performed before.

6. Order led alarm

The objective is to permanently check the difference between the theoretical value of the distance traveled and the actual value read by the sensor on the wheels.
The color of the led (if it is in jumper mode on the rear case) will indicate the overflow of the difference between the actual value and the theoretical value in relation to the order.
Commissioning of the led in alert set mode.

A jumper on the back of the case allows the LED function to be selected in alert mode.

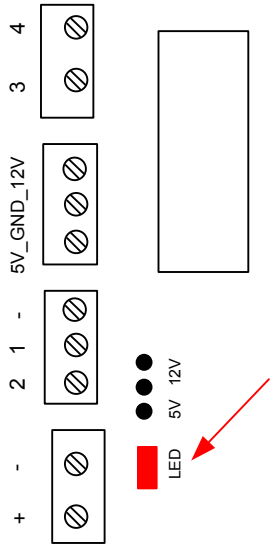


fig6

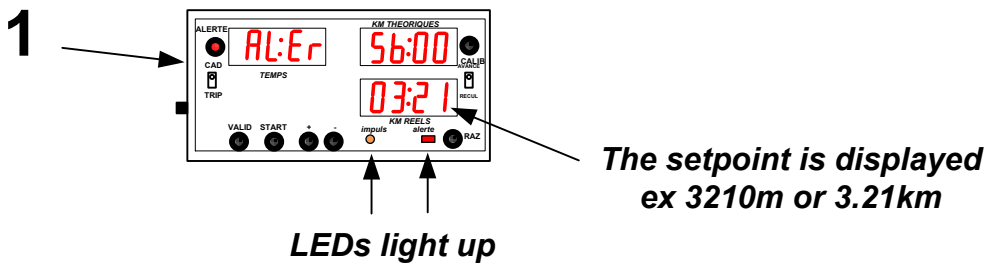
a. Display of led

In the range (+/- the set value) the LED is green,
If the actual value + the order is greater than the theoretical value the indicator is orange.
If the theoretical value + order is greater than the actual value, the led is red.

b. reading the stored value

2) press the ALERT key
The order is displayed the distance is given in: km * display and 10m * display

Reading of the recorded order.



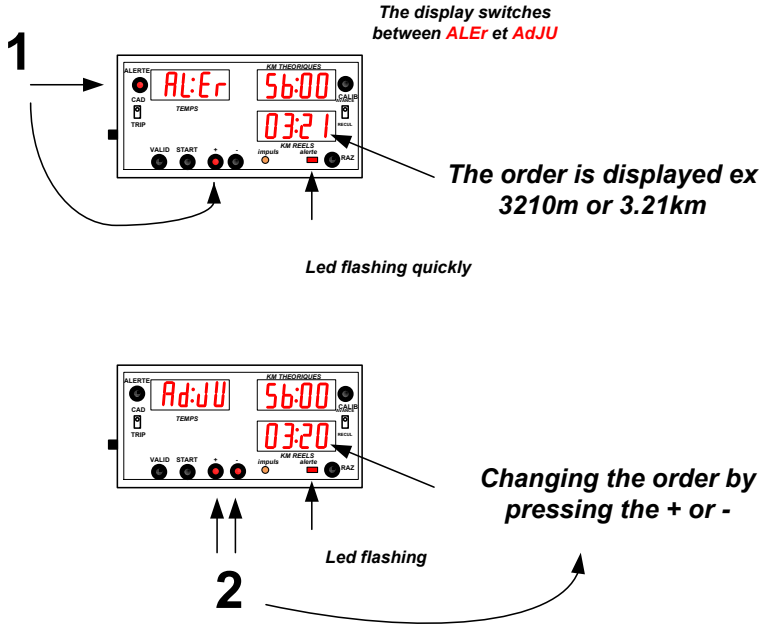
ATTENZIONE: Questo valore non deve superare 99:99

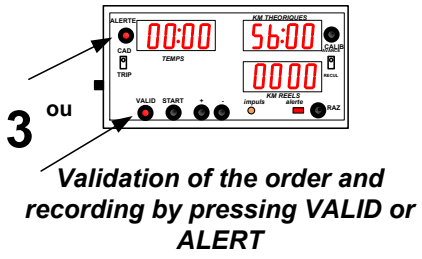
c. Changing the Registered Value

1) Leave your finger on the ALERT key and at the same time press the + and -
2) the led flashes red, display 1 alternately indicates "ALEr" and "AdJU"
3) change the value by pressing the "+" or "-" keys, either by pulsing or by pressing the button for fast scrolling

(more than 3 seconds = fast scrolling).

2) Press the ALERT or VALID key to validate and save the new value.

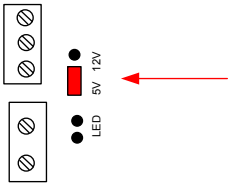




To exit during modification without the value being saved press the RESET key to turn off the power supply with the switch on the side.

7. Installation and test of the inductive probe on wheel:

IN THE ABSENCE OF PROBE: PUT THE JUMPER IN THE 12V POSITION IN ORDER THE ORANGE LED (PULSE) REMAINS OFF.



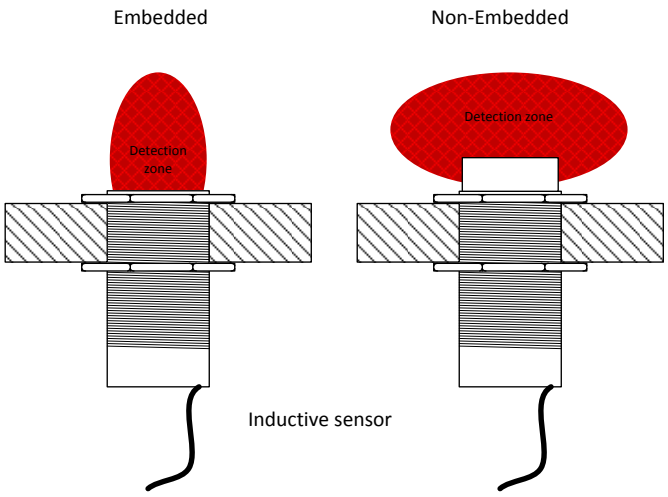
a. Choice of inductive sensor to put on a vehicle wheel.

Caution: when buying a sensor, the support is not usually supplied, it will be necessary to make a robust support that does not vibrate during the movement of the vehicle.

Reminder on operation: The inductive sensors produce a magnetic field at the end of their sensing head. When a metal object enters this field, this field is disturbed and then the oscillating field is attenuated, hence metal presence detection.

The selection criteria for purchase: **lengh area detection, PNP, voltage, number of wires, embeddable or not, diameter, body length, IP, connection, indicator.**
For your car we recommend:

• Detection distance: **between 2mm and 4mm**, this depends on the clearance present on the mechanism without play or sail on the rotation.
• The output is in **PNP** mandatory to operate with the CT512.
• The voltage is **12V in three wires** or 5V in two wires.
• 3 wires (+, -, output) in 12V or 2 wires in 5V.
• Embeddable or not, depending on your mechanical installation (indicates whether the head requires a clearance, see diagram).
• The diameter **is 12mm** (the most standard) depends on the available space.
• The **length of the body** depends on the position you have.
• Placed on a wheel subject to water spray at least **ip67**.
• Connector **without connector**: source of failure.
• **With LED**: Allows you to adjust the sensor more easily during installation.



b. General information on the use of a wheel probe

The distance traveled comes from an apprenticeship over **a distance of 1000 meters**. During this movement the limp will count the number of impulses on the wheel but one can also calculate this number of points. Nevertheless, various factors can modify the order value resulting from the training or the calculation: the load of the car, the tire temperature of the tire inflation, the position of the sensor on departure and arrival ... The number of points on a km to adjust it according to the known error.

The choice of the number of detections per revolution of the wheel will give the accuracy of the displayed value. The more detections, the better the value of the "km traveled". The maximum is 5 detections per revolution of the wheel.
To reduce the error, the probe must be placed on the left side of the wheel (closest to the center of the road to reduce the error due to turns.

c. Sensor error

Calculation of the error as a function of the detection number per revolution.

A detection per wheel revolution will have an approximation of 2 turns of wheel. Either on 1000 m for a tire of 205/45 R16 an error of 3.712m or 0.37% of maximum error. For 50km a mistake of 185m. This error can be reduced by 2 if the detection number (up to 5 max) is increased by 2. That is to say in our example 37m for 50km traveled.

Note on a tire: ex 195/55 R15

195: indicates the section of the tire (its width) in millimeters. The higher the number, the wider the tire.

55: indicates the tire series (this is the ratio of 'sidewall height / sole width'). Here, the height of the flank corresponds to approximately
55% of the section.

R: means radial architecture.

15: This number indicates the inside diameter of the tire in inches (one inch = 2.54 cm). This corresponds to the size of the rim on which it will be mounted.

Calculation of the number of points for one km (which can be entered manually):

The error in the calculation will be more important than if we carry out an apprenticeship.
Estimated number of pulses over 1Km
Calculation of the circumference of the tire

Formula :

(2 x tire width x height / width ratio 100/100) + (25.4 x rim diameter) * PI = distance in mm per revolution of wheel (circumference)

Example: 205/45 R16

Calculation of the flank height 45% of 205 = flank height therefore 92.25
= (2 x flank height + diameter in inches x25.4) x π

Calculation: ((2 x 45 x 205/100 + 25.4 x 16) x 3.1411 ...) = 1856.36mm = 1.856m per revolution of wheel
To make 1KM it will take 1000 / 1.856 = 538 turns of wheel. This value will be multiplied by the number of detections of the probe on one turn of the wheel.

For example, the value to be entered in the learning order for two pulses per wheel revolution (if there are two pads on the wheel) is 538x2 = 1076 (to enter the value, see chapter Adjustment of The CALIBRATION).

Calculation of the correction following an error detection:
The reduction of the number of pts on the calibration order results in an increase in the distance traveled (in KM) for the same number of points on the wheel.

Example: following a route evaluated on the gps at 35 km, the CT512 display shows the value of 360m less than the value traveled, ie 34,640 km. The calibration order is 589pts (for 1000m).

The correction to be made is:

(Number of km displayed on the CT512) / (nb of km actually traveled (gps)) × calibration order of CT512 = new

d. order calibration

$$\frac{\text{Number of km displayed on the CT512}}{\text{nb of km actually traveled (gps)}} \times \text{calibration setpoint of CT512} = \text{new order calibration}$$

So in our example: (34,640 / 35)× 589 = 583pts / km is the new value to enter into the CT512.
Verification of result:
Indeed the number of points will always be 35x589 = 20403pts for 35km the wheel does not change the number of points remains the same.

The developed tire is 1000/583 = 1.715 ... m
So 20403pts x 1.715 ... = 34.991 m ~ 35km

We could have done simpler:

On 35km the number of points is 20403pts
The error is: 589 * 360/1000 = 212 pts
Or, one error is 212 pts on 20615 ie 1% so 1% change of the calibration value therefore on 589 pts is changed from 5 to 6 pts in 1000m.

A distance displayed on the ct512 lower than the actual distance traveled requires reducing the number of points of the calibration.

Conversely

A distance displayed on the ct512 greater than the actual distance traveled requires increasing the number of points of the calibration.

The modification must be made progressively by half the calculation: 583 + 6/2 = 586
The value of 589 by 586 will be changed (see procedure for modifying the teach-in instruction of the probe).

Example 2:
Information:
A 1987 Peugeot 205 XS with 165/70 R13 tires.
1 pulse per revolution of the wheel.
Calculations:
http://www.toutcalculer.com/automobile/dimension-pneu.php
Circumference of the tire 165/70 R13 = 1.763m
1000 / 1.763 = 567 points in the order.
In practice we note that we have to put 577 (correction brought on 35km).

e. Mounting the probe

Installation of the probe (not supplied).
See sketch:

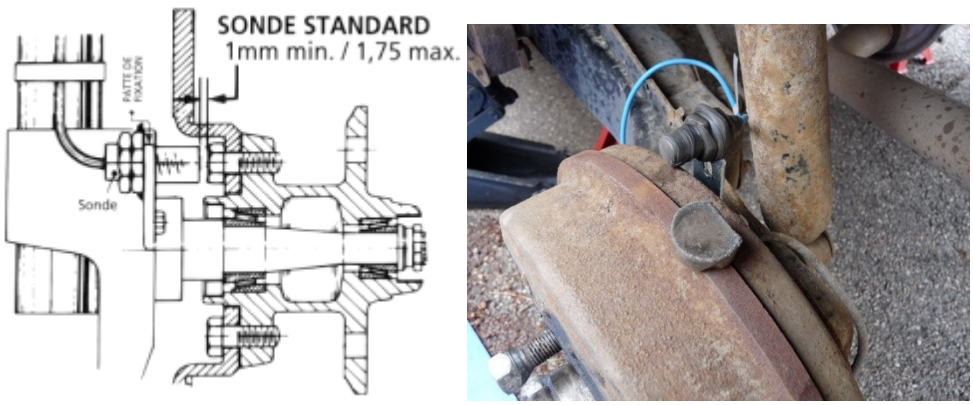


fig3

The metal part (which may be a magnet) is glued to the drum.

6. Wiring the 5v or 12v inductive sensor

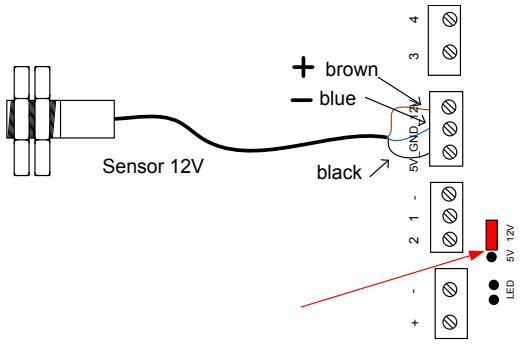
f. General information:

There are 5V probes sold by the tripmaster manufacturers on the market, the detection distance is 1.5mm up to 3.5mm. There is another alternative: the use of industrial probes in all sizes and detections up to 1.5 cm, but they operate from 12V (at 24v). This is why the CT512 is equipped to accept Two voltages but requires a different connection and the positioning of a jumper according to the choice of the probe.

Only one of the two solutions can be chosen (5 or 12v) in any case the two sets.
Always make the connections off (risk of destruction of probes).

WARNING : the supply voltage is directly connected to the 12V probe, check that the installed probe corresponds to the supply voltage of the CT512 housing (the lead battery has voltages which vary according to temperature, age, The quality of the alternator .... between 10v and 14,8V)

Observe the voltage selection switch before switching on again.



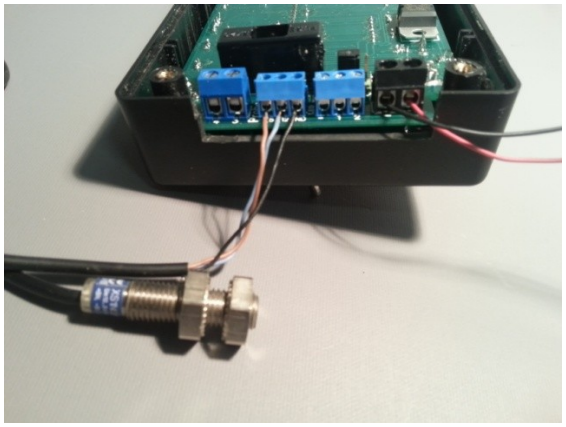
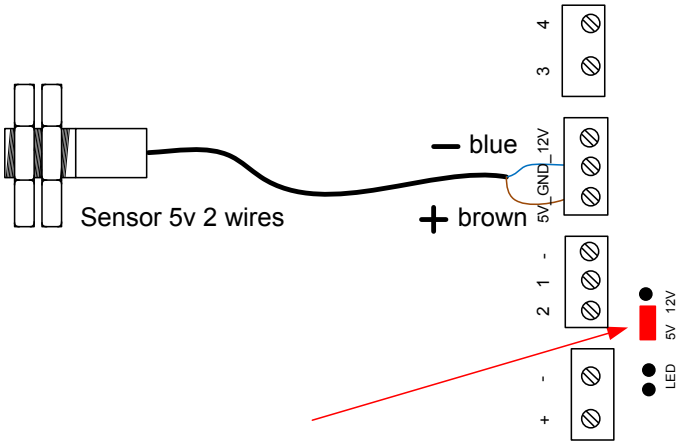


fig4



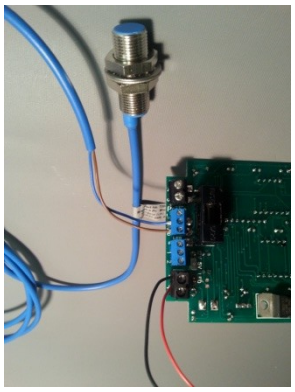


fig5

Rear view of wiring board 5V

Brown wired on the +
Blue wired on –

g. Verify probe operation.

1) Power On
2) Switching to trip mode (Switching the switch to TRIP)

Verification of operation

Each time a metal object passes in front of the probe, the actual KM counter increments and the orange led (above the theoretical KM display).
If the LED does not light when a metallic object passes, check your connection and / or the probe.

Voyant indiquant un appui sur un bouton poussoir ou les impulsions sur la sonde (5V ou 12V)

Warning : beyond a few mm (depending on the probe) the sensor no longer detects.

Each time the bolt passes in front of the probe the display N ° 3 (actual KM) must increment (press Bp Enable) and the orange led will light up.

Be careful if the sensor is placed at the limit of the detection zone (wheel sets, sensor on oscillating mounting ...) detection will not be completed completely, pulses will be lost and the values displayed after learning and when moving Vehicle will be distorted.

h. Mounting on speedometer:

To study according to the material,
In general the sensors on box or on counter can connect like a probe TR005 (5v)
Use with a dry contact: the connection must be placed in 12V mode (with jumper and terminal block).

8. calibration: Learning mode

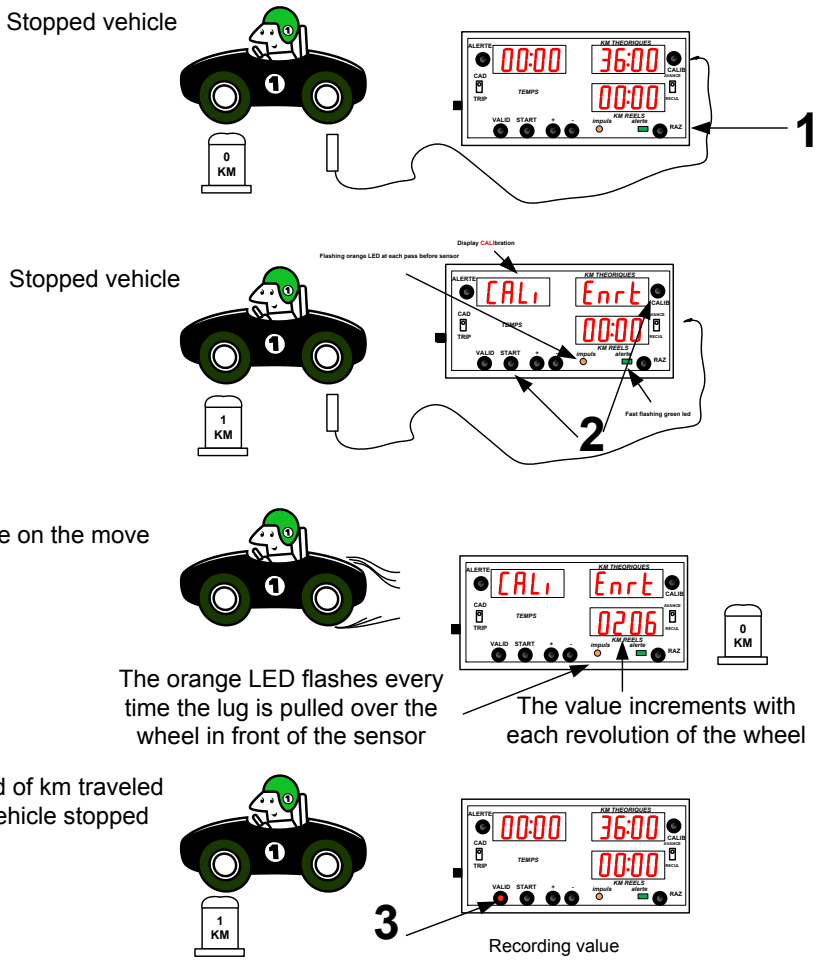
WARNING: Calibration can only be performed if the timer mode is not active.

The green LED is on
Position yourself in front of the KM start terminal.
1) Press the"**RAZ**" button until the display 1 to 3 is reset (about 3 seconds) or restart with the ON / OFF button.
2) Press the "**CALI**" key and the "**START**" key.

3) the display on the first display shows "**CALi**" on the second "**Enrt**" and the third display is set to 0.
(Green LED blinks rapidly)

4) Move with the vehicle on 1KM.
-Start recording of the number of passages of the metal part in front of the probe
Maximum registration of 9999 pts
Arrival at the end of the KM
5) press the "**CALI**" key: end of procedure and value recording.

Note: the value of the number of points recorded on a KM is visible on the 3rd display when the CALIB key is pressed.
Power failure during the procedure = Abort and resume of the saved value before the start of the procedure.



A power outage or an on / off exits the calibration mode without saving the values.

The value of the km can be provided by the odometer or a gps nevertheless an approximation exists for these two information, approximation that will be found on the value measured by the device.

9. Adjustment of the CALIBRATION:

Following the calibration, if there is a difference between the odometer and the displayed value on the timer, it is possible to modify the value resulting from the training.

To do this :

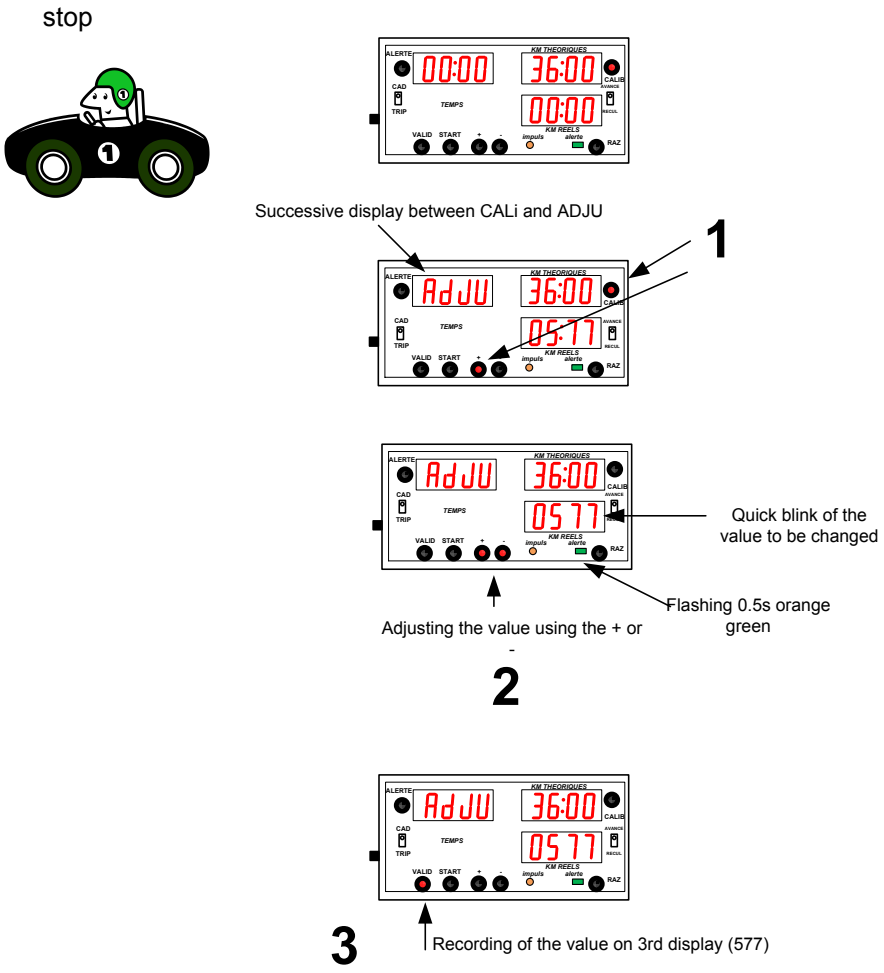
Stopped vehicle

1) Reset
2) Support BP calibration and at the same time on + or -

The BP calibration can be released

3) Use the + or - keys to change the value until the desired value is reached.
4) Save the value by pressing the "validation" key

WARNING this change can only be made when the timer is not in the counting mode (normal operation).



10. *Connecting a remote reset*

A pedal (or a push button) which must be a switch contact there must be no power supply !!! The distance between the connector and the contact must not exceed 3 meters. The resistance of the contact must be less than a few ohms.

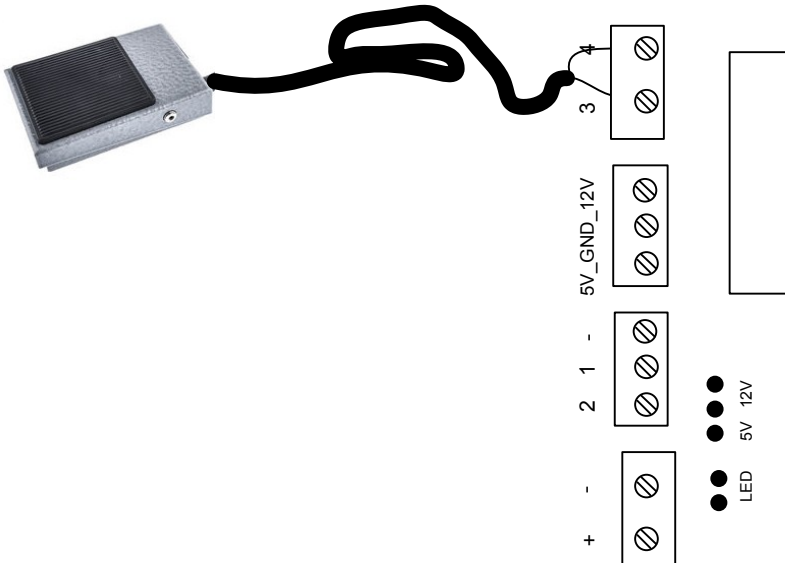


fig7

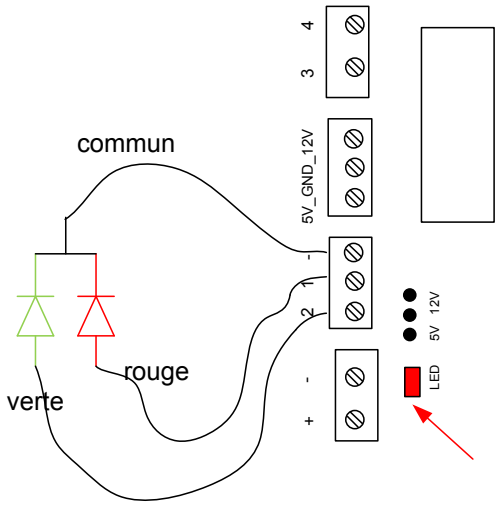
WARNING is the 5v of the card that feeds the pedal or the limp especially never mixing it with another tension that would entail the destruction of the card!

11. Connection of additional LEDs

Note that the current delivered by the board can not exceed 9 mA per LED protection of the LEDs by resistances of 330ohms 1 / 2watt The LEDs must have a minimum voltage drop of 2 volts (Do not forget the jumper).

You can use the led of type: KINGBRIGHT L-119SURKCGKWT LED, Red Green, Crossing, 2mm x 5mm, 110 °, Rectangular.

Warning: You must not put more than one led per output at the risk of destroying the card: max current (10ma).



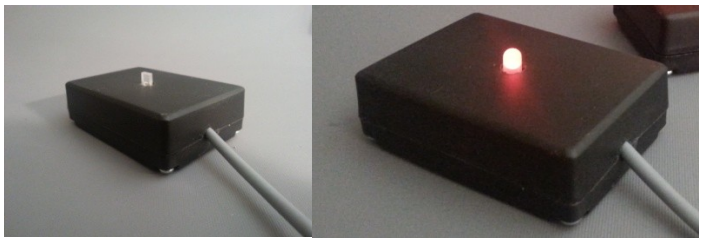


Fig8 (terminal-side view)

12. Characteristics of the device:

-Consign of maximum average speed 99.99 kmh
-Time operation in timer mode 99 minutes (1h39mn) beyond it will be necessary to reset the unit to restart a cycle (press the reset button for ~ 3s).
- Maximum acquisition frequency of the probe is greater than 300hz
(~ 30hz = at a speed of 200km with 5 detection bolts on the probe with a tire mounted on a 12 inch rim).
-Power consumed in use: 3watts (250ma under 12v)
-Power consumed at no-load: zero.
-Power supply: minimum 7V -maximum 25V
-A 400ma fuse protects the device (accessible by clip on the rear panel)
-The housing is only suitable for negative grounding systems.

13. Dysfunctions

The connection of the power cable is very important, it is the source of many errors, a microswitch brings an anachic form of operation with incoherent displays and functionalities inoperative. To prevent this from putting pods (no plug type: cigarette lighter), tightening of the wires, tightening of the screws in conformity, avoid that the wires do pull on the connectors by fixing them using rather large wires (avoid the 0.25,0.5,0.75 ,) ....

Precautions on use for the passage of cables:
Avoid using the same path as motor cable bundles. Protect the cable by a sheath if there is a risk of injury or friction due to vibration.
In some cases insoluble use a shielded cable (be careful the shield must have a single ground point connected to ground car if possible battery ground).

Vehicle interference may be the cause of the following situations.
-At the stop the amber led flashes (advance a few centimeters with the vehicle) if the blinking problem persists cable routing or noise interference of the vehicle.
-The display freezes or flashes and shows signs of instability.

Areas of interference may originate from:
-the electric motors (pump, fan ...)
- ignition circuit (HT).
-alternator.

Before making a final wiring, pass the wires in flying wiring to ensure that there are no unwanted interference, switch to the final wiring once the cable passage has been validated (vehicle in operation). It is also possible to use shielded cables (spider mounting: a single ground connection point).

Software malfunction
If the set point values are absent (0000 or 99999 ...), ***the display flashes erratically*** : value of calibration=0
solution: reset the factory values such as:

- speed order 47,5km / h
- calibration order 577 points
- warning alert 2.00 km

Malfunction due to supply voltage.
When the power supply breaks down or a voltage drop of less than 8V or a voltage exceeding 15V, the probe numbers change without the probe being subjected to counting errors.

The count probe counts alone vehicle at the stop!! The cause: the probe is placed at the limit of detection, respect the distance between the probe and the detection part.

14. Software version

Simultaneous press on the on switch and the push button validation indicates the version of the software.

Cadenceur / tripmaster

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