



**TECHNICAL MANUAL**  
**FOR ELECTRONIC SPEEDOMETER**  
**STR-RIEJU MATRIX 2**

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**!!!!!! ATTENTION !!!!!!**

**BEFORE GOING ON PLEASE CAREFULLY READ ELECTRICAL FEATURES AT**

**PARAGRAPH 14**

**VERIFYING THE FUNCTIONAL VOLTAGES FOR OPERATION OF THE SPEEDOMETER**

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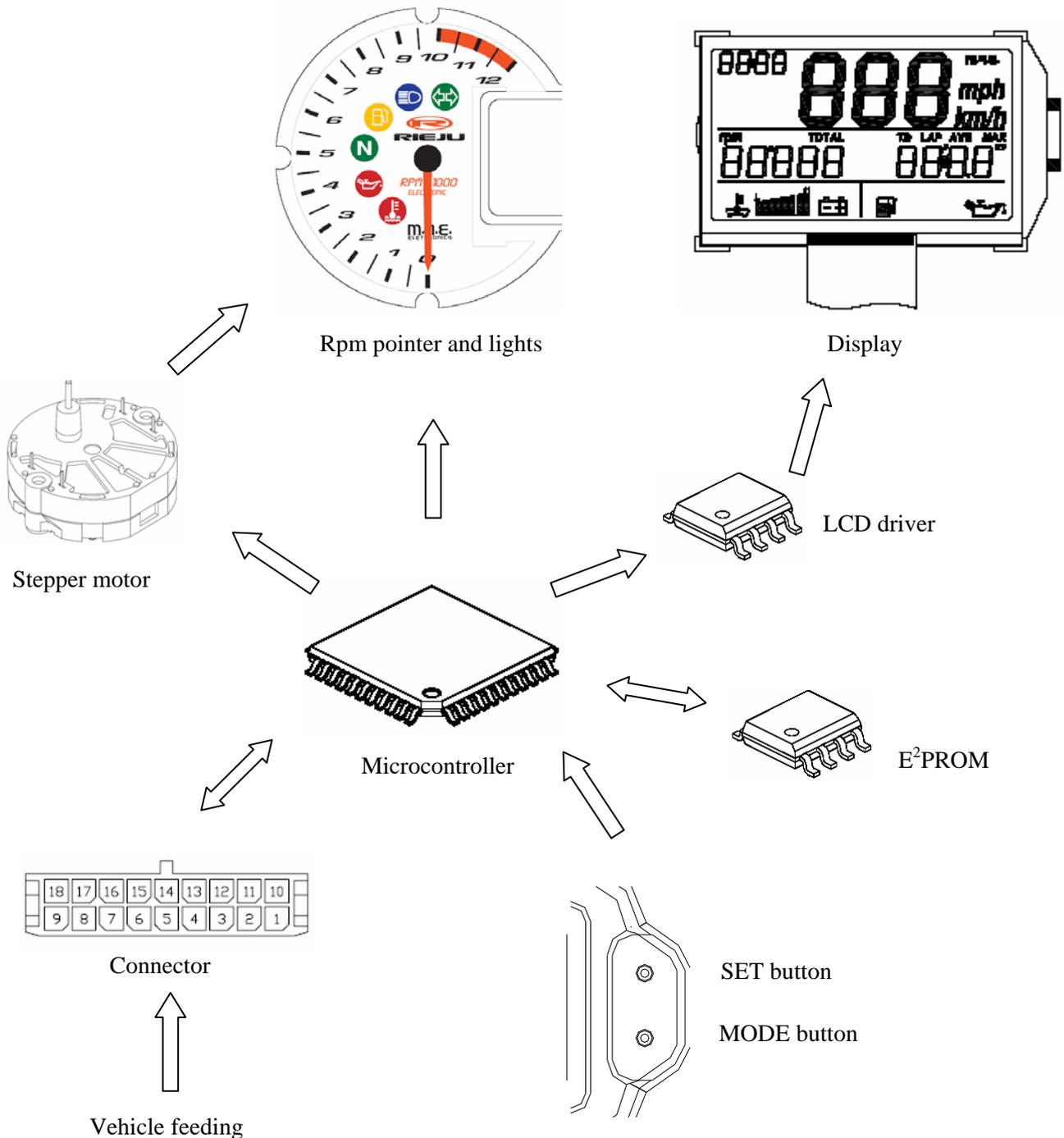
**1. AIM**

This document constitutes the technical manual with functional specifications for STR – RIEJU speedometer.

**2. REFERENCES**

M.A.E. electronic devices' general contract.

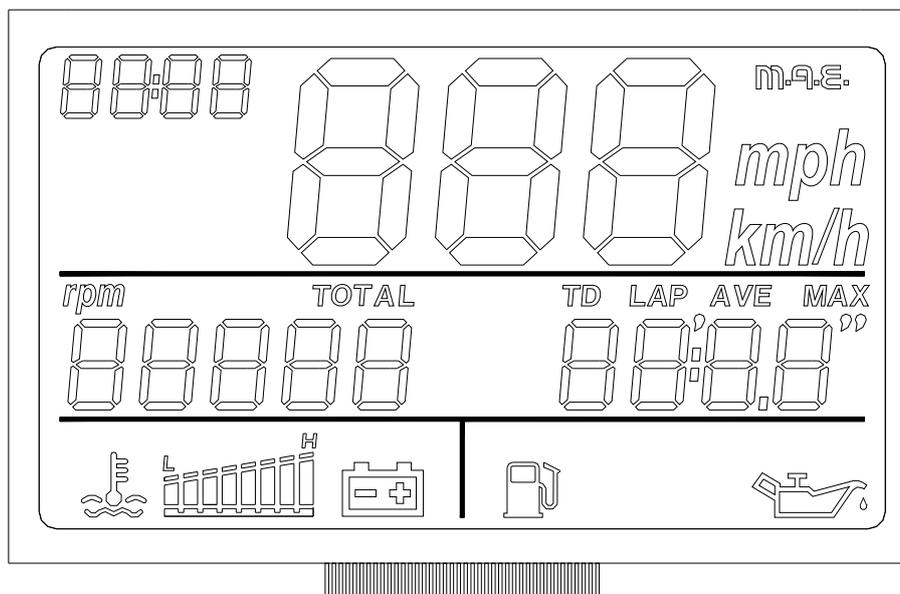
**3. SYSTEM GENERAL DESCRIPTION**



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## 4. COMPONENTS DEFINITION

### 4.1. LCD Display



Picture 4-1: lcd display

### 4.2. Mode and Set buttons

The device has got two buttons normally OPEN that close on a NEGATIVE.

Button 1: *MODE*

Button 2: *SET*

Functions and use of buttons is described in following paragraphs of the technical manual.

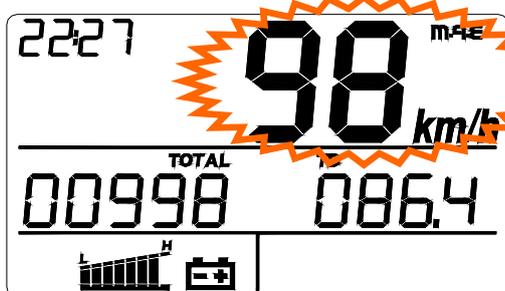
Ref.: STR-MTE-03-070613

## 5. FUNCTIONAL CHARACTERISTICS

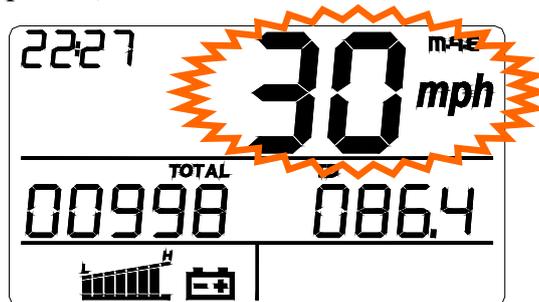
### 5.1. Instant speed function

The information is *always* visualized on digits 5÷7, see picture 5-1

If measurement unit is km/h (default value) the corresponding digit is visualized; if You push the button and entering the Set-Up it is possible to select mph unit of measurement (pic.5-2).



Picture 5-1: Speed indication Km/h



Picture 5-2 Speed indication mph

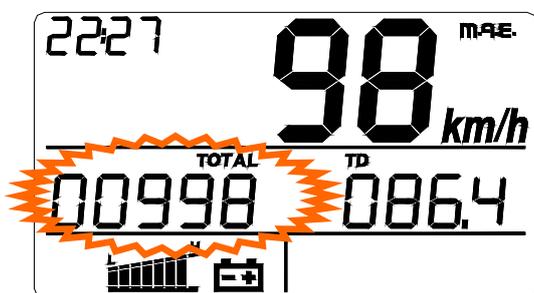
The system has got following parameters:

Wheel Circ. [mm]	Pulses / lap	Max speed	Overspeed	Resolution
Selected by end user Min. 1.000 - Max 2.500	Selected by end user Min. 1 - Max 12	200 km/h (124 mph)	6% constant all over the scale	1 km/h (1 mph)

### 5.2. Totalizer function (TOTAL)

The information is visualized on digit 8÷12 and accompanied by *TOTAL* logo, as shown in pic. 5-3.

The data is permanently memorized in a non volatile memory (E<sup>2</sup>prom refresh every km).



Picture 5-3: Total covered distance

If the memory is empty You'll see numbers 00000 visualised.

This information is always calculated in km. Anyway it must be expressed in km or mph. You can select the chosen information by entering the Set-Up menu.

During normal using of the instrumentation it is not possible to set the information to zero.

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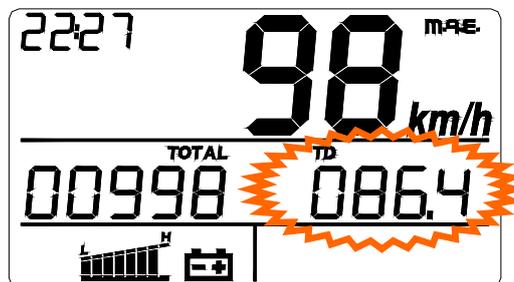
### 5.3. Trip function (TD)

This function describes the correct working/visualization of the board automatic partial totalizer.

This function is always represented on digit 13÷16 and by logo TD (pic.5-4).

The visualized data represents the vehicle covered distance expressed in miles or km (depending on the selected measurement unit), with resolution 0.1 (miles or km).

This counter is automatic: in fact it automatically starts with the first pulse arriving from speed sensor.



Picture 5-4: Partial covered distance

The data isn't memorized in a permanent mode.

It is possible setting the counter of this parameter to zero by pushing the *Set* button for about 03 sec. (in correspondence of the TD function) till the value 000.0 appears.

It is possible setting to zero the TD function both when the vehicle is stopped and when it is running, this causes also the setting to zero of LAP and AVE functions.

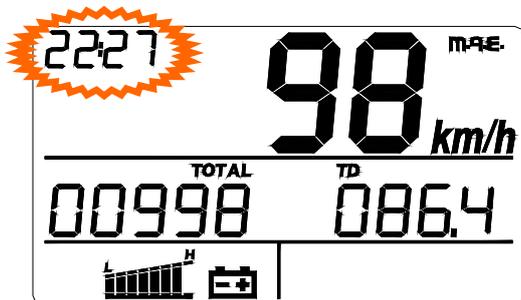
If the data gets over 999.9 the system automatically sets to zero TD, LAP and AVE functions and then starts again the counting.

**Obs.5-1:** So: If there is no feeding the TD value is hopeless lost.

### 5.4. Time Function (TIME)

This function describes the correct working/visualization of the current hour. This function is always shown in the format hh:mm, by using digit 1÷4 (pic.5-5).

Clock is active also when the microcontroller is in sleep mode phase and regulation of the hour can be done only when the vehicle is stopped.



Picture 5-5: clock

This information is not saved in the memory.

Visualized Series:

- from 0:00 to 23:59 for method 0-24
- from 0:00 to 12:59 for method 0-12 am
- from 1:00 to 11:59 for method 0-12 pm

Clock precision: to be defined

**Obs.5-2:** If there is no feeding the TIME value is hopeless lost.

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Clock regulation can be done by pushing *Mode* button until when only segments related to TIME function are active (about 5sec.), while all the others are off (see picture 5-6).

It's possible to modify in series: first the hours then the minutes, this depends by the selected data (that will be shown blinking with  $f=1\text{Hz}$ , Duty=50%).

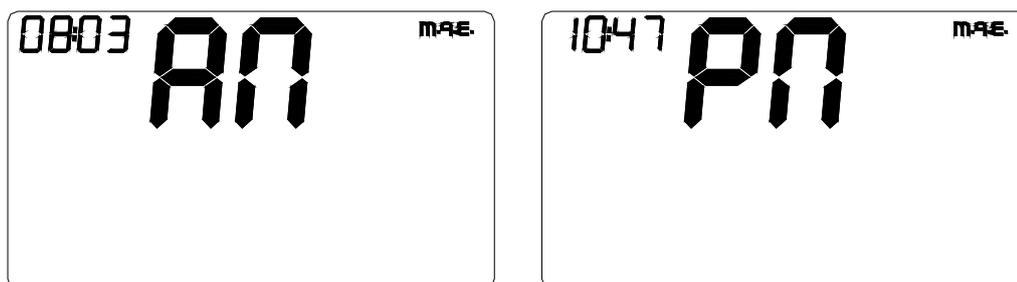
By pushing the *Set* button the selected parameter will add one unit, while by pushing the *Mode* button it will be possible to select the chosen parameter (minutes or hours) and to exit from regulation phase.



Picture 5-6: clock regulation

Time parameter will be shown in 0-24 format if unit of measurement chosen is km/h, while it will be shown in 0-12 format if unit of measurement is mph.

In this case on the display You will see on 5 and 6 digits the logo "AM" or "PM" during regulation phase, see picture 5-7.



Picture 5-7: clock regulation format 0-12

**Obs.5-3:** *Entered the regulation menu, if no buttons have been pushed, the system will automatically return to standard method of operation (saving possible modifications).*

**Obs.5-4:** *Entered the regulation menu, if the vehicle starts (speed>0), the system will automatically return to standard method of operation (saving possible modifications).*

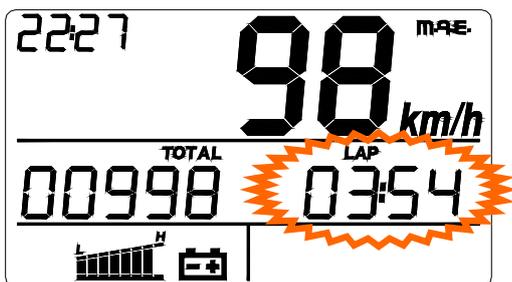
Ref.: STR-MTE-03-070613

### 5.5. Automatic Chronometer Function (LAP)

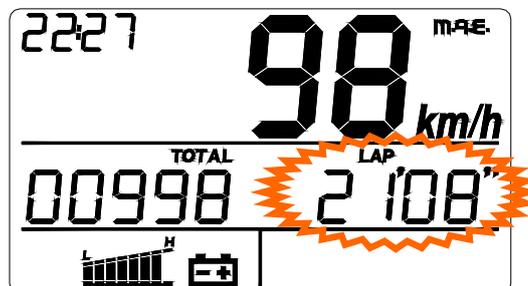
This function describes the correct working/visualization of the chronometer related to TD and AVE.

This information is visualized by using digit 13÷16 and logo LAP.

The data represents the effective route time of the vehicle in the form mm:ss if hours = 0 (pic.5-8) and in the form hh:mm if hours > 0 (pic.5-9).



Picture 5-9: lap in format hh:mm



Picture 5-8: lap in format mm:ss

It is automatically activated by the first pulse coming from the speed sensor and it stops after 3 seconds from receiving of the last pulse which arrives from the speed sensor.

If hours >0, when LAP is operative, the digit that separates the hours from the minutes is shown blinking, while it is shown fixed when LAP is not operative

If hours = 0, when LAP is operative, the digit (‘ and ‘’) that separates the minutes from the seconds is shown blinking, while it is shown fixed when LAP is not operative.

The data isn't memorized in a permanent mode.

It is possible to set to zero the counter of this parameter by pushing the *Set* button for about 2 seconds, in correspondence of the function LAP till when the value 00'00'' appears.

The setting to zero of LAP, which is possible both when the vehicle is stopped or when the vehicle is running, produces the setting to zero of TD and AVE too.

If the data gets over the value 23-59 (which means 23h59'59''), the system provides to set to zero LAP, TD and AVE, then it starts again the counting.

**Obs.5-5: If there is no feeding the LAP value is hopeless lost.**

### 5.6. Average speed function (AVE)

This function describes the correct working/visualization of average speed function related to TD and LAP.

The information is visualized by using digit 13÷16 and logo AVE (pic.5-10).

The data represents the average speed of the vehicle (expressed in Km/h or in Mph depending on the selected measurement unit) that is calculated as ratio between covered distance (TD) and the time used to cover this distance (LAP).

The average speed is updated every 0,1 Km (or 0,1 Miles, depending by measurement unit selected).

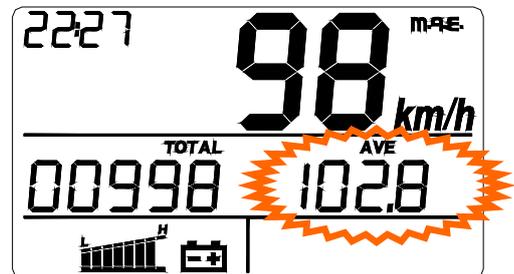
Ref.: STR-MTE-03-070613

The data isn't memorized in a permanent mode.

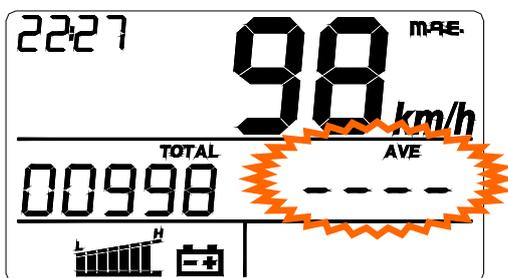
It's possible to set to zero the counter of this parameter pushing the *Set* button for about 2 seconds, in correspondence of the function AVE, till when the value 0.0 appears.

The setting to zero of AVE, which is possible both when the vehicle is stopped or when the vehicle is running produces the setting to zero of TD and LAP too.

AVE setting to zero is foreseen when LAP function arrives to 23:59:59 value or when TD function rises 999.9 value.



Picture 5-10: Average speed indication



If the data is out of range , it will be visualized - - - -, as shown in picture 5-11

Picture 5-11: average speed out of range

**Obs.5-6:** *If there is no feeding the AVE value is hopeless lost.*

### 5.7. Max. speed function (MAX)

This function describes the correct working/visualization of maximum speed function. The information is visualized by using digit 14÷16 and logo MAX (pic.5-11).

The parameter identifies the maximum speed achieved by the vehicle, expressed in km/h or mph depending on the selected unit of measurement.

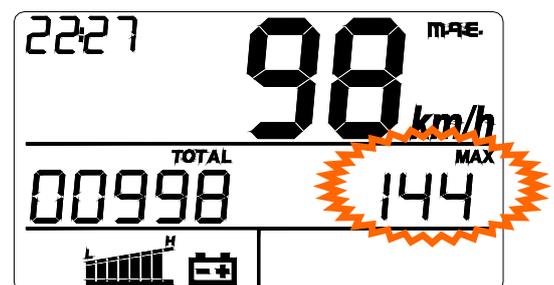
It's possible to set to zero the counter related to this parameter, in correspondence of MAX function, by pushing *Set* button till value 00 appears.

The setting to zero of MAX function is possible both when the vehicle is running or stopped.

Changing measurement unit, will cause conversion of MAX value.

The data isn't memorized in a permanent mode.

**Obs.5-7:** *If there is no feeding the MAX value is hopeless lost.*



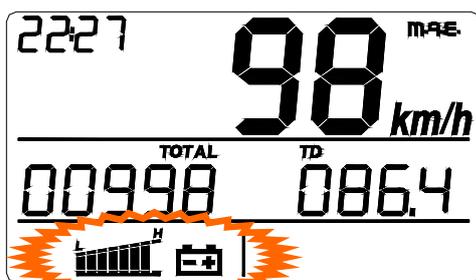
Picture 5-11: Maximum Speed

Ref.: STR-MTE-03-070613

### 5.8. Battery charge level function

The information is visualized on the bottom left part by using the graphic bar, accompanied by the battery symbol ignition, as shown in picture 5-12.

The graphic bar, updated every 0,5 seconds, is managed by the following table:



Picture 5-12: battery level

Voltage [V]	Active segments
Till 9,49V	1
From 9,50V to 9,99V	2
From 10,00V to 10,49V	3
From 10,50V to 10,99V	4
From 11,00V to 11,49V	5
From 11,50V to 11,99V	6
From 12,00V to 12,49V	7
Over 12,50V	8

### 5.9. RPM

The value of rpm is shown by the analogic quadrant.

Overboost: between 10.000 and 12.000 rpm

The number of rpm pulses are settable between 1 and 6

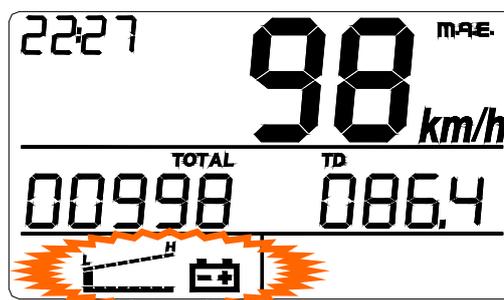
## 6. ALARMS MANAGEMENT

### 6.1. Battery voltage alarm

Every time that found out voltage value goes down 9,5V, the system starts alarm routine to signal the possibility that after switching ON of the vehicle, the speedometer can loose its settled data.

The signal is the graphic bar visualization (regardless the current function), by blinking the first segment of the bar and battery symbol as shown in picture 6-1.

This indication does not change the operation of the speedometer, that normally continues its activity with the only difference that when there is this alarm the previous logo is shown.



Picture 6-1: battery voltage alarm

When the voltage goes over 9,5V the alarm status turn off.

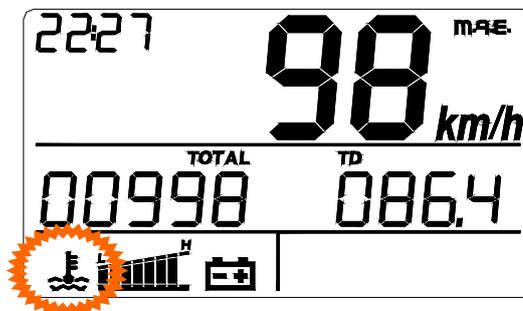
Ref.: STR-MTE-03-070613

### 6.2. Radiator liquid temperature alarm

Every time that radiator liquid temperature sensor closes on earth, the  icon is visualized on the display (radiator liquid symbol) as shown in picture 6-2.

At the same time the microcontroller will turn on the related light on the dial (see paragraph 7.5).

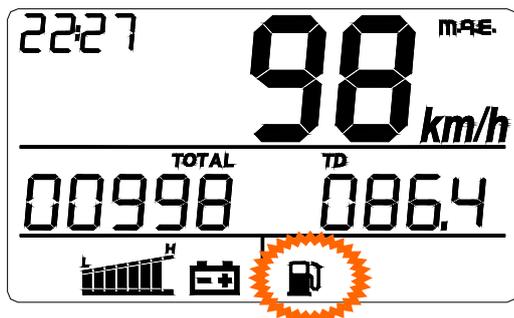
The icon disappears and the light turned on when the sensor opens again the contact.



Picture 6-2: Radiator liquid tempertaure alarm

### 6.3. Fuel Level Alarm

Every time that fuel level sensor closes on earth, the  icon is visualized on the display (fuel reserve symbol) as shown in picture 6-3.



Picture 6-3: Fuel level alarm

At the same time the microcontroller will turn on the related light on the dial (see paragraph 7.4).

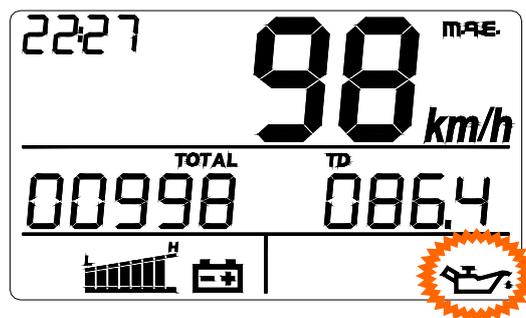
The icon disappears and the light turned on when the sensor opens again the contact.

### 6.4. Minimum oil level alarm

Every time that oil level sensor closes on earth, the  icon is visualized on the display (minimum oil level symbol) as shown in picture 6-4.

At the same time the microcontroller will turn on the related light on the dial (see paragraph 7.6).

The icon disappears and the light turned on when the sensor opens again the contact.



Picture 6-4: Minimum oil level alarm

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## **7. BACKLIGHT AND INDICATORS LIGHTS FUNCTION**

### **7.1. High Beam light**

The system has to switch on the led when the input No.12 of the connector is high, at the same time of High Beam ignition.

### **7.2. Indicators lights function**

The system has to switch on the led when the inputs No.2 or No.13 of the connector are high, at the same time of Indicators lights ignition.

**PLEASE NOTE: Signal must arrive to the device already alternate.**

### **7.3. Neutral light function**

The system has to switch on the led when the input No.6 of the connector is low, at the same time of placing of gear lever in neutral position.

### **7.4. Fuel light function**

The system has to switch on the led when the input No.15 of the connector is low, at the same time of minimum level of fuel tank.

### **7.5. Radiator liquid temperature light**

The system has to switch on the led when the input No.1 of the connector is low, at the same time of liquid's over heating.

### **7.6. Oil light function**

The system has to switch on the led when the input No.4 of the connector is low, at the same time of minimum level of oil tank.

### **7.7. Backlighting and dial lights function**

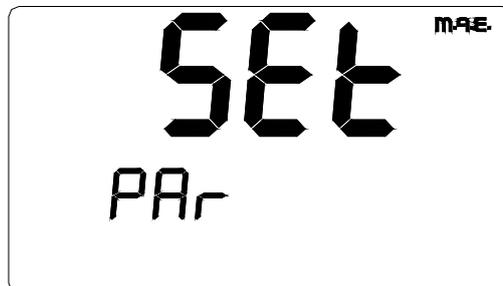
LCD and dial backlight is orange and is always ON when the key is turned on.

Ref.: STR-MTE-03-070613

## 8. SET-UP MENU

The entry in the set-up menu is only possible when the vehicle is stopped by pushing at the same time the *Mode* and the *Set* button for about 04 seconds regardless the visualized function.

On the display the “*SET Par*” logo will appear fixed (as in the picture 8-1) for the entry in the set-up menu of parameters.



Picture 8-1: parameters set-up menu

**Obs.8-1:** If the input #5 (settings) on the connector is connected to ground, it is possible to change every parameter.

If the input #5 (settings) on the connector is not connected to ground (default condition), it is only possible to change measurement unit.

### 8.1. Parameters SET-UP menu

This menu allows to modify the following parameters:

- Wheel circumference (min 1.000mm max 2.500mm) (factory)
- Number of pulses for every turn of the wheel (min 1 max 12) (factory)
- Number of pulses for every turn of the engine (min 1 max 8) (factory)
- Measurement unit of distance (km/h or mph) (factory + user)

To save the modifications in the memory, it is necessary that the set-up procedure is completed using the Mode button by keeping pressed the Mode button in correspondence of the measurement unit selected.

When the dashboard is in the set-up menu, if :

- velocity becomes >0
- the button is not pushed for 20 seconds

the dashboard will exit from setup menu without saving any changes and will restore the previous values.

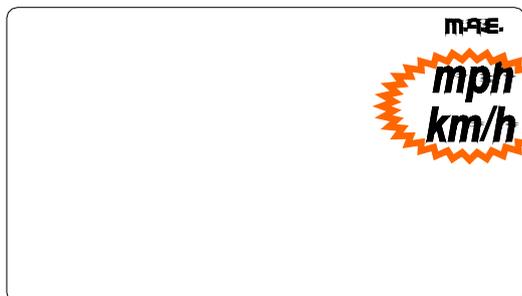
**Only in the case in which the procedure of Set-Up is completed in a correct way, the system goes on with the saving in permanent memory of all the made selections.**

Ref.: STR-MTE-03-070613

## 8.2. Modifications allowed to user (input #5 disconnected)

### 8.2.1. Distance unit measurement regulation

The display the symbols km/h and mph will be shown and the selected value will be shown first blinking (f=1Hz, Duty=50%) (picture 8-2).



Pressure on Set button causes the change in shown blinking unit, while the Mode button pressure, in correspondence of blinking unit, allows to select the same unit and the passage to following screen (or going out from regulation, depending on #5 input).

The information concerning the selected measurement unit is saved in memory.

Picture 8-2: distance unit misure regulation

**Obs.8-1:** *Changing measurement unit will cause the conversion of TOTAL and will set to 000.0 TD.*

**Obs.8-2:** *Once inside the regulation menu:*

- *if 20 sec. will pass without the button mode is pushed, or*
- *if the vehicle is turned on (speed>0), or*
- *if the key is turned OFF*

*the system will be automatically taken to the standard operating mode and the modifications possibly produced will be lost.*

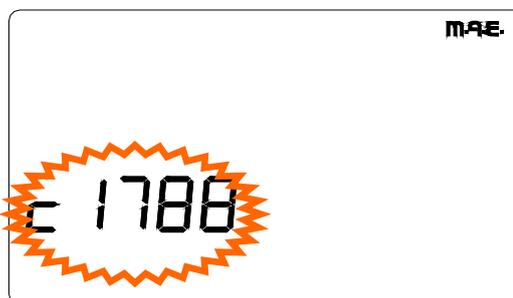
## 8.3. Modifications allowed to the factory (input #5 connected to gnd)

### 8.3.1. Wheel circumference modification

The display is introduced as shown in picture 8-3, where the information of wheel circumference is visualized on digit 13÷16, preceded by the letter "crf" on digit 10÷12.

It's possible modifying the various digits which constitute the value of the wheel circumference, leaving from the most significant digit and moving in series towards the least significant digit.

Starting from the selected data (that will be shown blinking with f = 1 Hz, Duty = 50%), a short pressure of the Set button will allow an unitary increase, while a long pressure of Mode button will allow to select a different digit.



Picture 8-3: wheel circumference regulation

The selected circumference of the wheel is saved in memory.

Ref.: STR-MTE-03-070613

**Obs.8-3:** Regulation : from 1.000mm to 2.500mm with step of 1mm. Setting a value over 2.500mm, will cause the circumference set to default value

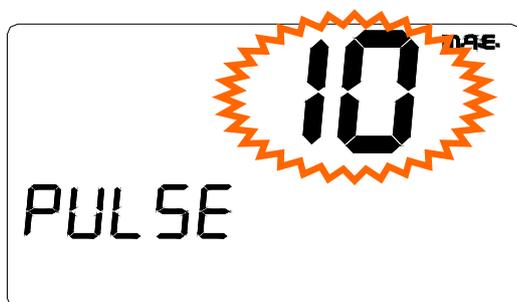
**Obs.8-4:** Once inside the regulation menu:

- if 20 sec. will pass without the button mode is pushed, or
- if the vehicle is turned on (speed>0), or
- if the key is turned OFF

the system will be automatically taken to the standard operating mode and the modifications possibly produced will be lost.

### 8.3.2. Modification wheel revolution impulses

This parameter expresses the number of impulses that the speed sensor sends to the instrumentation for every wheel revolution.



Picture 8-4: wheel turns regulation

The selected value is shown blinking as in picture 8-4 (f=1Hz, Duty=50%).

Pressure of Set button allows the unit increase impulses, from a minimum of 1 to a maximum of 12.

Pressure of Mode button allows the value confirmation and the passage to the following screen.

The information concerning the number of impulses which the instrumentation receives from the speed sensor is saved in memory.

**Obs.8-5:** Impulses can also NOT have the same distance.

**Obs.8-6:** Once inside the regulation menu:

- if 20 sec. will pass without the button mode is pushed, or
- if the vehicle is turned on (speed>0), or
- if the key is turned OFF

the system will be automatically taken to the standard operating mode and the modifications possibly produced will be lost

### 8.3.3. Modification engine revolution impulses

This parameter expresses the number of impulses that the vehicle sends to the instrumentation for every engine tree revolution.

The chosen value is shown blinking (with f=1Hz, Duty=50%).

Visualization on the display, picture 8-5, has "RPM" on digit 10÷12.

Pressure of Set button allows the unit increase of engine turns impulses, from a minimum of 1 to a maximum of 8.

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Pressure of Mode button allows the value confirmation and the exit from Set-up menu.

The information concerning the number of impulses of the engine is saved in memory.

**Obs.8-7:** *Once inside the regulation menu:*

- *if 20 sec. will pass without the button mode is pushed, or*
- *if the vehicle is turned on (speed>0), or*
- *if the key is turned OFF*

*the system will be automatically taken to the standard operating mode and the modifications possibly produced will be lost.*

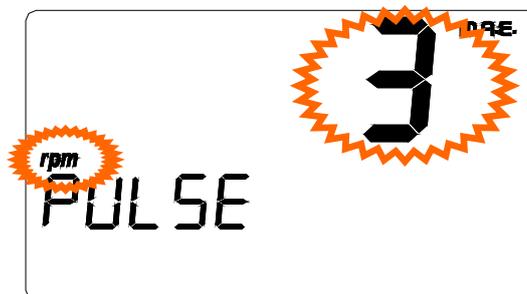


Figura 8-5: engine turns regulation

**8.3.4. Distance unit measurement regulation**

See paragraph 8.2.1

**8.4. Regulations sequence**

Input #11 disconnected →

MEASUREMENT UNIT
---------------------

Input #11 connected to GND →

WHEEL CIRCUMFERENCE	WHEEL REVOLUTION PULSES	ENGINE REVOLUTION PULSES	MEASUREMENT UNIT
------------------------	-------------------------------	--------------------------------	---------------------

Ref.: STR-MTE-03-070613

## 9. **MODE AND SET BUTTONS FUNCTION**

Aim of the buttons is:

- allow functions scrolling
- regulation of the clock
- set to zero the TD, AVE , LAP and MAX values.
- entering the Set-up menu to modify the wheel circumference value, the measurement unit value of distance, the number of impulses for every turn of the wheel and of the engine, and finally to associate the graphic bar to the selected information.

The function scrolling is always possible (it means the passage from one function to the following one) with the vehicle stopped or not. To update the instrumentation with the new function, it's enough briefly pushing the button (tmin = 1 sec.), when it will be left the display will show the new function.

The setting to zero of TD, of the chronometer, of the average and max. speed can be done both with the vehicle stopped or in movement as described in the previous paragraphs.

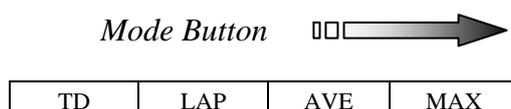
Clock regulation is possible only when vehicle is stopped.

The entering in the Set-up menu is possible only when the vehicle is stopped by pushing at the same time the two buttons for about 4 seconds; the back-up of all data will be done only when the *Mode* and *Set* buttons (it depends on selected set up chosen) will allow the exit from the Set-up menu..

Key	Mode	Set	Speed	Function allowed
OFF	-	-	-	Buttons inhibited
ON	ON	OFF	>0	Scrolling
ON	OFF	ON	>0	Set to zero of selected function
ON	ON	ON	0	All functions are allowed

### 9.1. **Sequence of represented functions**

The function scrolling is always possible, with the vehicle stopped or not, by using the *Mode* button as follows:



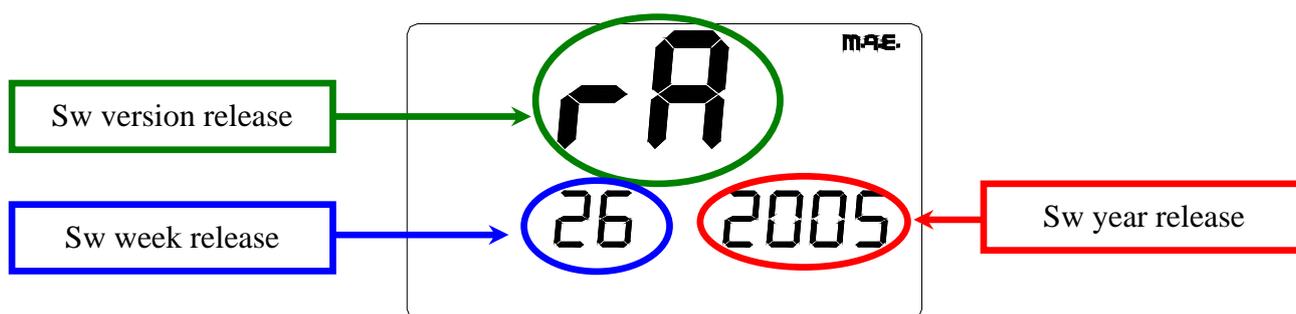
TD	→	partial covered distance
LAP	→	time on turn
AVE	→	average speed
MAX	→	max speed

Ref.: STR-MTE-03-070613

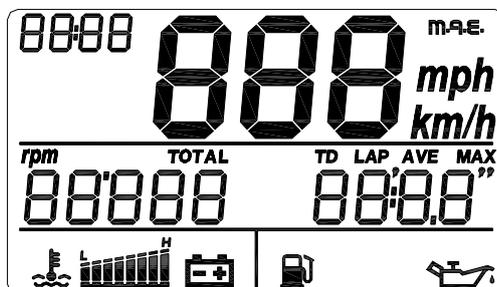
## 10. START-UP

At the start-up (key from OFF to ON), the system gives to the user some information which are shown in following screens (or pages):

- *First page:* visualization of the release date and software's version (for about 2 seconds). This information is shown only during the first installation of the instrumentation (picture 10-1).
- *Second page:* display check. All the display segments are ON for about 2 seconds (picture 10-2).
- *Third page:* visualization of the wheel circumference, of the measurement unit selected for the distance, of the impulses' number for every turn of the wheel and of the engine, visualization of symbols associated to graphic bars (picture 10-3).
- In correspondence of screens over described, the system start the lights' check and backlighting check: all lights' led are active and at display check end they are off.
- After all the check, the system will show the normal visualization.

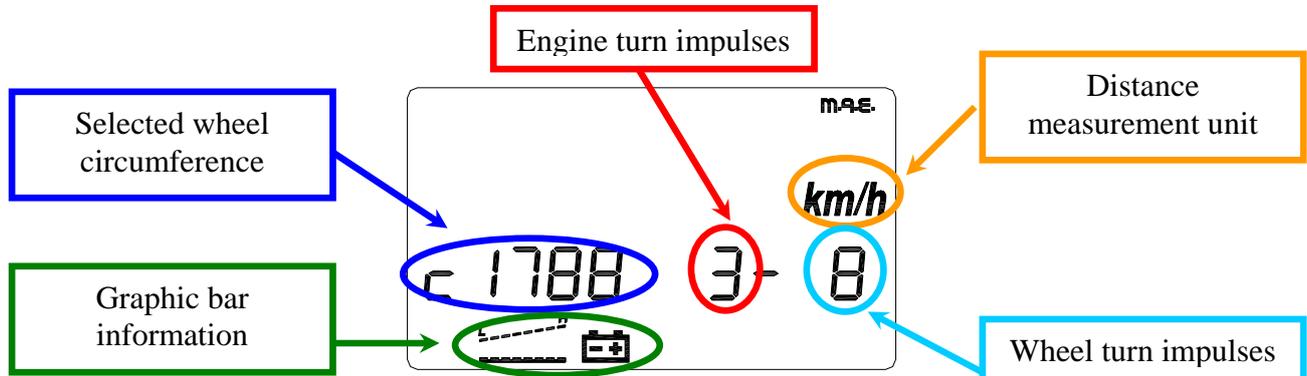


Picture 10-1: first page



Picture 10-2: second page

Ref.: STR-MTE-03-070613



Picture 10-3: third page

**Obs.10-1:** *If during the Start up phase the vehicle starts (speed>0), the instrumentation will interrupt the check and will return to the standard operation mode.*

**Obs.10-2:** *If during the Start up phase the key will be turned off, the instrumentation will interrupt the check and will return to sleep mode.*

Ref.: STR-MTE-03-070613

## 11. SLEEP-MODE AND WAKE-UP

### 11.1. Sleep mode

The microcontroller enters the *sleep-mode* phase, with low current absorption, when the key is turned off.

To reach this aim, during sleep mode phase, every activity will be interrupted, the display and its backlighting will be off, only the update of current hour is on.

Sleep-mode phase can always be reached, regardless from selected function

### 11.2. Wake-Up

Awakening from *Sleep mode* phase occurs when the key is turned ON.

Immediately after the microcontroller awakening following activities happen:

- Check of the display and of lights for about 2 seconds
- Visualization of selected wheel circumference, of wheel turns impulses, of unit of measurement and of graphic bars for about 2 seconds (see picture 10-3).
- Starting of last visualized function before sleep mode status and qualification of all functions

## 12. FIRST INSTALLATION OF DEVICE

Default values of the device:

- Circumference: 1.930mm
- Measurement unit of distance: km/h for speed and km for distance
- Turn wheel/impulses: 5
- Turn engine/impulses: 3

To modify one of these parameters You have to follow the procedure as in Set-up menu paragraph.

During first installation of device the display always shows the updated software version and date.

Ref.: STR-MTE-03-070613

## 13. TEST MENU

**!! ATTENTION !!**

*Using of test procedure needs only qualified staff.*

*To avoid every kind of drawbacks or bad functioning please*

**DO NOT USE**

*foreseen menu function and do not disclose the content of this chapter to final end user.*

Entry in test menu is allowed only during installation phase of device on the vehicle, by placing at earth the test wire #5 (usually without cable) and keeping pushed Mode and Set button together. In these conditions the system will place itself on Test menu and following operations will be possible:

- Erasing of the E<sup>2</sup>prom (E2PROM)
- Calibrating pointer position on the dial (IND)

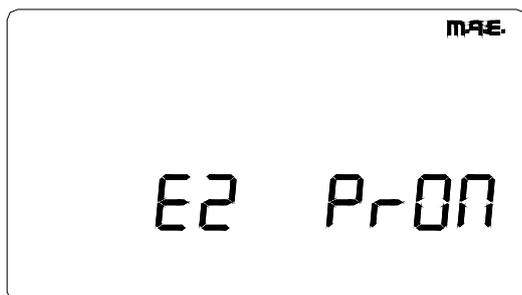
To well operate inside the Test Menu some inputs of the speedometer are set up again as follows:

Input	Function
Fuel	Up button
Wtemp	Md button
Oil	Down button

### 13.1. Erasing procedure E<sup>2</sup>prom (E2PROM)

During the tests and the controls of the instrumentation, it's useful erasing the E<sup>2</sup>prom memory.

To enter the procedure the *Md* button must be pressed inside the correspondent screen in Test Menu (by using *Up* and *Down* buttons the selection will occur, pic. 13-1).



Now the display shows a warning message (Reset shown blinking, picture 13-2): **this operation IS IRREVERSIBLE and deleted data can't be recovered..**

Picture 13-1: entering E<sup>2</sup>prom erasing

Ref.: STR-MTE-03-070613

By using Up or Down button it is possible to fail this operation and come back to Test menu.

By using *Md* button it is possible to go on with the operation and completely erase the whole memory.

A confirmation message (fixed logo *Reset*) will remember the operator the possible need to make pointer calibration.

The return to Test menu will be possible by using whatever of the three buttons (*Up*, *Md* or *Down*).



**Picture 13-2: Erasing procedure warning**

### 13.2. Pointer's procedure of calibration (IND.)

The calibration is useful to correct eventual mistakes of position made during the phase of setting out of the pointer.

To enter this procedure the *Md* button must be pressed inside the correspondent screen in Test menu (by using *Up* and *Down* buttons the selection will occur, pic.13-3).



**Picture 13-3: Entering pointer calibration**

Now the display will ask to the operator to put in micro step numbers necessary to allow the pointer to reach the zero on silk-screen printing.

By using *Up* button it is possible to start movement of the pointer in clockwise direction.

By using the *Down* button it is possible to start movement of the pointer in anticlockwise direction.

By using *Md* button it is possible to exit from Automatic test procedure and come back to previous Test menu.

The selected value will be saved in a permanent memory.

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## 14. ELECTRICAL FEATURES

Maximum working features:

Param. No.	Feature	Simb.	Min.	Max	Units
PM1	Max working voltage	$V_{MAX}$	—	17	V
PM2	Storage Temperature	$T_{Sto}$	-20	+85	°C
PM3	Max supplied current from pin 7	$I_{Hall}$		20	mA
PM4	Max current applicable to inputs	$I_{InMax}$	—	20	mA
PM5	Max current applicable to outputs	$I_{outMax}$	—	20	mA

Normal working features:

Param. No.	Feature	Simb.	Min.	Typ.	Max	Units
PO1	Supply voltage	$V_{DD}$	7	12	16	V
PO2	Operative Temperature	$T_{Op}$	-20	—	+80	°C
PO3	Current absorption during On with all the light switched on (Vbatt=13,0V)	$I_{on}$	—	280.48	361.50	mA
PO4	Current absorption during On with all the light switched off (Vbatt=13,0V)	$I_{on\_spie}$	—	132.05	173.25	mA
PO5	Current absorption during Sleep (Vbatt=13,0V)	$I_{slp}$	—	132.64	200.25	mA

Ref.: STR-MTE-03-070613

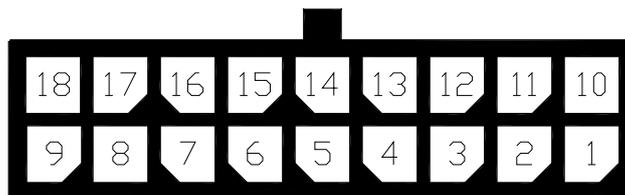
## 15. CONNECTOR PINOUT CONFIGURATION

The connector is directly placed on the bottom side of the board.

Producer MOLEX  
Part Number 43045-1818

#	Meaning
1	Radiator liquid temperature
2	Left Indicator
3	----- <i>Not connected</i>
4	Min. level oil mixer
5	----- <i>Not connected</i>
6	Neutral
7	Vcc Sensor
8	RPM
9	Positive battery

#	Meaning
10	Sensor input
11	----- <i>Not connected</i>
12	High Beam lights
13	Right Indicator
14	GND
15	Fuel
16	----- <i>Not connected</i>
17	P15
18	GND



Male figure – Female insertion side.