

Professor Technology Vehicle Travelling Data Recorder

User Guide V 2.9



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I. System Profile

i. System Profile

Vehicle Travelling Data Recorder, commonly referred to as the black box, is a digital and electric recording device which records and stores driving speed, time, mileage and other information about vehicle driving and could export data through interface.

As early as in the 1970's, Japanese and some EU countries commenced forcing the installment and use of the data recorders by laws on some passenger vehicles and trucks and currently the installation has almost been finished.

Road Traffic Safety Law was put into force from May 1, 2004. Article 14 of its Implementation Regulations stipulates: passenger service vehicles, heavy motor truck and semi-trailing tractor shall install vehicle traveling data recorder that conforms to national standards.

Currently, passenger transport companies, public transport groups, travel and transport companies, logistics companies, dangerous goods transportation companies, enterprises and non-profitable organizations all over the country are orderly installing vehicle traveling data recorder.

ii. Main Functions

1. Self-check
After power-on, the data recorder will inspect system parts and ports. After auto inspection, the sound of “tick -” appear on the LCD screen.
which gives a hint to users that the recorder begins to work normally.
2. Identification
When driving, the driver can identify the ID with a USB disk, and the recorder can save the traveling data for each driver respectively.
3. Record, storage and collection functions for real-time clock, date and driving time

The recorder provides date and clock in Beijing Time with the format year/month/day for real-time date and hour/minute/second for real-time clock.

4. Driving management

1) Daily statistics

The Recorder can count daily mileage, driving time and cumulative mileage

2) Record speed per minute

Record for the latest 360 hours,

3) Vehicle traveling data statistics and comparison

The vehicle data recorder software can compare statistical data according to the vehicle and drivers, therefore. That facilitates the administrator to get to know the operation conditions of vehicle and drivers in a certain period of time more intuitively.

5. Accidents prevention

1) Speeding alarm

When a car is faster than the preset speed value (can be set, i.e. 120km/h), the immediate sound "tick..." will remind the driver to slow down to avoid accidents.

2) Speeding record

When the vehicle speed exceeds the preset speed value, the recorder can provide the number of speeding, start time of speeding, duration of speeding, the highest speed and the driver's code by analyzing the speed curve.

3) Fatigue driving alarm and record

If a driver drives for almost 4 successive hours (according to provisions of GB, fatigue driving means driving for more than four successive hours, and that with midway rest of less than 20 minutes), the recorder will give a sound prompt. If he drives for over 4 successive hours, the recorder will begin to record and give sound warning;

6. Accident doubtful points record and analysis.

The recorder will record such data as traveling speed and brake etc within 20s before brake in every 0.2s;

7. Revealing and printing

Via LCD display or micro printer, the recorder will print the average driving speed record, overtime driving (fatigue driving) record, over-speed record and relative

vehicle data of every minute within 15 minutes;

8. The driver files and traffic information management functions

1) Recorder can record the identity of the driver

2) The drivers insert USB identity card to confirm their code every time before each driving.

3) Archive management of vehicles and drivers

Management of vehicle information and drivers' files

The management software can provide good human-computer interface, realize input, change, inquiry and statistics of vehicle data and driver file and report form printing function. Therefore, we can quite intuitively examine such data as driving curve, over-speed record, accident doubt point data, fatigue driving record and traveling distance etc.

9. Power-off protection

Recorder has power-off protection function, which means the recorded data will be maintained for 10 years.

10. Data Communication Function

The recorder can collect recorder data and set parameters via standard USB, serial port or wireless module;

11. Playback function for vehicle running track

By selecting and equipping with built-in GPS module, you can display vehicle running track in the host computer.

12. Save the video images (Select and equip with camera and SD card)

II. Configuration List and Appearance

i. Configuration List

- | | |
|--|---|
| 1. User's manual (with warranty card inside) | 1 |
| 2. Conformity Certification | 1 |

3. Built-in vehicle traveling data recorder integrated with a printer	1
4. Harness	1
5. Fixed part (with some screws)/Drawer(with two keys)	1
6. Printer	1

Note:

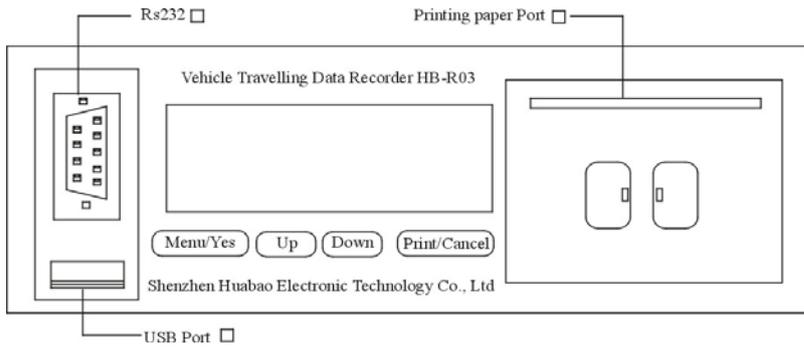
- Speed sensor is not the necessary part. It is required for the mechanical speedometer not for electronic.
- Card reader and ID card are optional according to customers' requirements.
- Built-in GPS module and GPS antennas are Standard accessories for Afterwards type GPS data recorder (GPM850-I type) – choose according to the customer request.

ii. Appearance

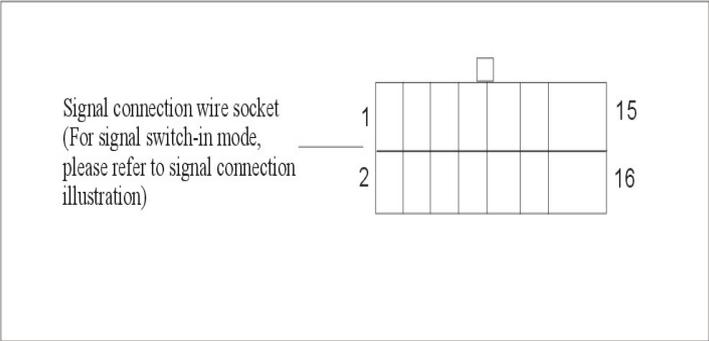
1. The overall appearance



2. The front panel plate schematic (after opening the cover for interface)



3. Rear panel schematic

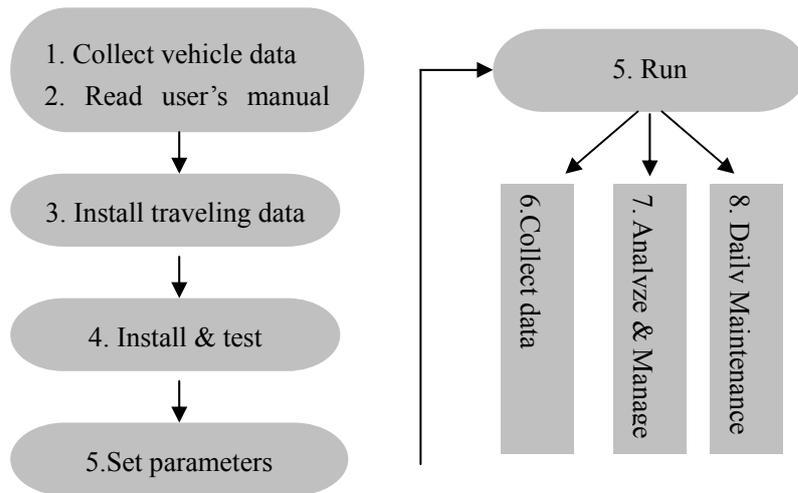


Signal cables socket

As for the signal connection, please refer to more detailed introduction on the next page.

III. Operation Procedures

i. Whole operation process



ii. Installation Procedures

1) Wire connection: Connect wires according to the following table (table 1) and be sure to confirm No., wire color and in-vehicle corresponding wire! As for the speed signal wire and the on-off signal wire, please refer to more detailed introduction on the next page.

2) Power on: Reconfirm the connection is proper, insert the plug into host interface. After the recorder auto inspection, the LCD screen will display information: current time, speed and drivers' code

3) Fixed properly: Fasten the vehicle traveling data recorder in a proper position with fasteners (Including several screws /Ark barrels (including two keys) or double-sided adhesive tape.



Warning

1. To be sure that power negative and heat shrinkable tube of recorder connected separated. Heat shrinkable tube takes iron directly
2. When inspecting wires, apply test lamp rather than poke them for inspection;

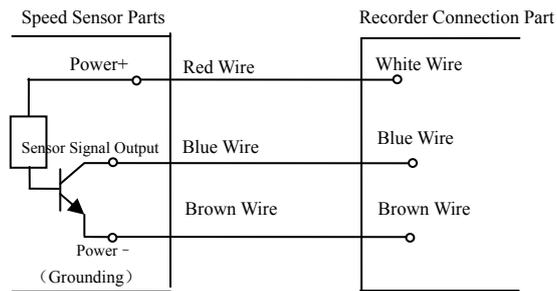
3. Enwind and bind up the whole wire with insulation adhesive tape and firmly fasten with wire clips;
4. Please bind up temporarily unused wires separately, in order to avoid touching each other or short circuit to ground;
5. To confirm recorder, speed sensor and printer power not short circuit or reverse connect is a must;
6. It was prohibited inserting sheet metal, or injecting corrosive gas and liquid into USB and RS232 interface;
7. Be sure to confirm the recorder, speed sensor or printer power is not short circuited or reversely connected;

✧ Introduction of Speed Signal Connection

❶ When the speedometer is electronic and has speed signal output terminal (the output circuit generally adopts OC door drive), connect blue wire (No. 10); if there is no speed signal output terminal connected with the speedometer, bind up heat shrink tube wire (No.9), brown wire (No. 12) and black wire (No.14) together and connect them to

vehicle bond strap in order to screen disturbance signal.

② When the speedometer is mechanical, the Hall speed sensor is required to be installed. See Table 2 for the connection;



Note:

Speed sensor's positive and negative can connected only to DC 5V power provided by the Vehicle Travelling Data only. Don't connect with vehicle power. (i.e. speed sensor's positive must connected to the white wire(No. 11) of the vehicle power; speed sensor power negative must connected to the brown wire(No. 12) of the vehicle power.)

Remarks:

- ① The positive power of speed sensor (i.e. red wire)
- ② The negative power of speed sensor (i.e., brown wire)
- ③ Speed sensor signal (i.e., the core of the blue on the sensor), and
- ④ The velocity sensor, the shield of 9 and recorder can heat shrinkable tube car at the same place up received by iron.

✧ Introduction to Switch Signal Wire

Currently, the recorder can connect 8 switch values (extended according to user's requirements), among which, the brake signal is the necessary braking signal regulated by the international standard.

If switch signal is the positive signal (enable high level), the recorder signal wire is connected at back of the switch; if switch signal is the negative signal (enable low level), the recorder signal wire is connected in front of the switch. Setting can be kept via management software.

Table 1: Data Recorder and Wire Interface No.

1	3	5	7	9	11	13	15
2	4	6	8	10	12	14	16

Table 2: Wire Connection (take 16-core wire for example)

No.	Wire Color	In-vehicle Corresponding Wire	
1	Light blue	Small lamp	Recommended connection (no this color connection for 9-core wire)
2	Light green	Right turn	
3	Pink	Left turn	
4	Purple	Close door	
5	Orange	Open door	

6	Green	Horn	Recommended connection
7	Grey	Distant light	
8	Yellow	Vehicle braking signal wire, i.e. brake signal wire	
9	Heat shrink tube	Vehicle bond strap	
10	Blue	The mechanical speedometer is connected with speed sensor signal wire and the electronic speedometer is connected with speedometer speed signal wire.	
11	White	Speed sensor power supply positive pole	Mechanical speedometer is required to be connected to the pole rather than electronic speedometer.
12	Brown	Speed sensor power supply negative	

		pole	
13	Red	Vehicle constant electric positive pole, i.e. vehicle battery positive pole	
14	Black	Vehicle constant electric negative pole, i.e. vehicle battery negative pole	
15		Backup	
16		Backup	

IV.Operational guide

Note: All the following operations should be carried out only when the vehicle is stopped.

1. Self-Check

After been electrified, the buzzer sounds a long tone like “tick----” and the recorder carries out the self-check. After the self-check is succeeded, the LCD screen displays the

speed, driver and time switch as shown in the following schematic figure:

Speed: 0 Km/h	Speed: 0 Km/h
01/01/09 08: 30	Driver: 100000

If the self-check fails and the connection of recorder is validated to be correct, please immediately replace the failed recorder with a new one and send the failed recorder for repair.

2. The recorder has four buttons named as “Menu/OK”, “Page Up”, “Page Down” and “Back/Print” respectively. The "Menu" is mainly used to page the display screen and confirm operations. “Page Up” and “Page Down” is mainly used to display information and feature selection that covers more than one screen. “Cancel/Print” is mainly used to cancel operations and print.

ii. Login (ID Authentication)

When the driver is switched or the driver logs in for the first time, the driver should insert the driver identification card into the USB interface of the recorder to authenticate. This operation is called “Login”.

When the Login operation is succeeded, the buzzer sounds a tone like “tick - tick” and the LCD screen displays the driver ID of the present driver (it is assumed that the driver ID of the present driver is 100088)

Speed: 0 Km/h
Driver: 100088

iii. Alarm for violation of regulations

The recorder's alarms for violation of regulations include fatigue driving alarm and speeding alarm.

1. Fatigue driving alarm

Fatigue driving: The continuous driving time of the same driver exceeds 4 hours.

When the recorder detects that there will be a fatigue driving, it will warn 5 minutes in advance. Now, the buzzer sounds a medium-long tone like "tick-- tick--" for 1 minute.

After a fatigue alarm, if the driver continues to drive for more than 5 minutes, the buzzer sounds a liaison like "tick, tick tick, tick " 5 minutes after the alarm and the recorder begins to record the fatigue driving and the alarm time is also 1 minute.

At this time, the recorder will record the license number of this driver and the start and end time of fatigue driving.

Note:

If the stopping time or time for switching driver exceeds the limit of 20 minutes, it will be as considered as a real rest. Or it will be still considered as continuous driving.

2. Speeding alarm

Speeding: The speed exceeded the maximum speed set by the recorder.

When the recorder detects speeding, there will be an audio alarm,. Alarm interface is shown as below:

Speed	110Km/h
Driver	100088

“110km/h” means the current speed;

Before the speed falls to below the regulation speed, the recorder will keep warning.

Note:

Here, the maximum speed refers to the maximum speed set in the recorder, but not the allowed highest speed of vehicles, nor the maximum speed limited by road.

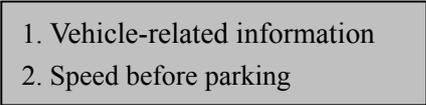
The conditions for the recorder to detect speeding data: the average speed within 5

seconds exceeds the maximum speed set in the recorder.

iv. Information Query

1. Query the vehicle-related information

In timing state, press “Menu” to display:

- 
1. Vehicle-related information
 2. Speed before parking

Press “Menu” again to enter the interface of “Vehicle-related information”. Press the “Page Up” or “Page Down” button to leaf through multi-lines of records. As is shown below:

Plate number: XXB00000
Characteristic Coefficient: 624
Sensor Coefficient: 8
Alarm Speed: 110
Vehicle VIN: 77777
777777777777

2. Query the Speed before Parking

2. 15 minutes before parking
Average speed of every minute
Date: 2009/01/01
09:10 60Km/h
09:09 58Km/h

Query the average speeds of every minute of the 15 minutes before the last parking of this driver.

In timing state, press “Menu” button, and press “Page Down” to enter the interface of “Speed before parking”. Press the “Page Up” or “Page Down” button to leaf through multi-lines of records.

3. Query the fatigue driving record

Query all fatigue driving records of recent two days of this driver.

In timing state, press “Menu” button and press “Page Down” button twice; or press “Menu” button in the “fatigue driving record” state to enter the interface of the “fatigue driving record”.

Press the “Page Up” or “Page Down” button to leaf through multi-lines of records.

3. Fatigue driving record
Format: Driver’s license number
Start time End time

4. Query the driver’s information

In timing state, press “Menu” button and press “Page Down” button thrice; or in the “driver’s information” state, press “Menu” button to enter the present time to query.

4. Driver's information
Driver code
Driver's license number

5. Query the speeding record

5. Speeding record
One record each page
Speeding01: HuaBao1
68881688888 110
01/01 10:33:01
01/01 10:33:30

In timing state, press "Menu" button and press "Page Down" button four times or press "Page Up" button three times to enter the interface of "Speeding record", then press "Menu" button to enter the speeding records inquiry.

"Speeding 01" means the first speeding information. "168881688888" is the license number of speeding driver. "110" is the speed with the speeding time behind.

6. Query the mileage record information

In timing state, press "Menu" button and press "Page Down" button five times or press "Page Up" button two times to enter the interface of "Mileage record information", then press "Menu" button to enter the speeding records inquiry.

6. Mileage record information	
Total mileage	00Km
Mileage of the day	00Km

7. Query the recorder information

In timing state, press "Menu" button and press "Page Down" button 6 times or press "Page Up" button once to enter the interface of "Recorder information", then press "Menu" button to enter the recorder information inquiry.

7. Recorder information

Serial number:

HB-R032009080888

8. About the Backlight

In case of normal display, press the “Page Up” button to enable the display of , and press the “Page Down” button to disable the display. When the backlight is enabled, if the present time is between 17:00 and 6:00 of the next day and meanwhile the vehicle has a speed, the backlight will be always on. If the vehicle stops during this period of time and there is no operation on the recorder, the backlight will be automatically turned off after 3 minutes.

v. Print

When parking, press the “Print” button on the recorder panel to print the plate number, VIN,

vehicle classification, driver's code, driver's license number, the print time, the average speeds of every minute of the 15 minutes before the last parking time, fatigue driving records of the last two calendar days, etc.

vi. Communication

The recorder can make a two-way data transmission, i.e. upload and download.

Download: data transmission from central PC to the recorder. The data include vehicle characteristic coefficient, plate number, VIN, driver's code, driver's license number and real-time clock.

Upload: data transmission from the recorder to central PC. The data include the download data stated above and: accumulative mileage within 360 hours, average speed of each minute, accumulative mileage within 2 calendar days before parking and all fatigue driving record.

This recorder offers two means of communication: USB communications and RS232 interface communications.

1. USB communication

First, format the USB disk with the FAT format. Then, set the USB disk ID card or setting card and acquisition card by management software of the Recorder. Connect the USB disk to the USB port, then the Recorder will access to the USB communication interface automatically after the USB device is detected. When the communication is completed, the Recorder will go back to clock mode. (See section 6 of this Part for detailed settings of USB acquisition card, ID card and setting card.)

Note: Do not unplug the USB disk in course of communication, or it may cause damage to the device.

2. RS232 interface communication

Connect the host computer to the Recorder through serial ports. After received instructions from the host computer, the Recorder will access to the RS232 communication interface to transmit data.

When the communication is completed, the Recorder will go back to clock mode.

vii. Instructions for the Recorder software

[See electronic documents for detailed instructions]

1. Set vehicle information and parameters

Plate number: XX B00000
Characteristic Coefficient: 624
Sensor Coefficient: 8
Alarm Speed: 110
Vehicle VIN: 77777
7777777777

Run the management software. First, add the Recorder serial number in [product management]; second, add the vehicle related information in [vehicle information management] and click [set to Recorder]; third, modify the relevant parameters required by the company, and connect the USB disk to PC, select this drive and click [set to USB disk]; finally, connect this

USB disk to the Recorder, there will be two tone like “tick, tick” to inform that the information setting is successful. If the serial-port setting is selected, you must choose COM1 to set. (If you have setting card produced by Huabao, this step is not required to be done by the software.)

1. In order to use the setting card to set the plate number, characteristic coefficients, speed alarm value and VIN number, press the “Page Up” and “Page Down” button under the flashing characters to choose the wanted letter or numbers, and then press “OK” to confirm and access to the setting of next character. The sensor coefficient and the first Chinese character of the plate number can not be modified.

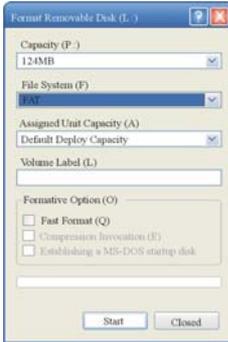
2. Speed Calibration: When install and test the recorder, keep the speed indicator of the speedometer at 60Km/h. If the recorder displays a different value, calibrate the value according to the following formula:

new character coefficient = current character coefficient × current speed displayed by the recorder /60.

2. Set the ID card

Run the management software. Add the driver related information in the [Driver Information Management] and click [Set ID card], then insert the USB disk and click OK. After that, the

driver inserts this ID card to the Recorder each time before driving. After successful identification, the Recorder will sound two tone like “tick, tick” to promote and display the ID number of this driver on the LCD. If you have card reading and ID card produced by PROFESSOR and select to set through serial-ports, you must choose COM1.



3. Set Acquisition Card

Format the USB disk in Windows operating system with FAT file format before use it. Do not select Quick Format, as shown in the right figure. File folders in the USB disk are not

recommended. It is better to buy normal models from well-known manufacturers. Click [Acquisition Card Settings] in [Settings], connect the USB disk to PC and select this drive, then click [OK].

4. Data Acquisition

Insert the set data acquisition card, that you have already set u, to the Recorder, the LCD will display “Collecting data.....please wait!” After the acquisition is completed, there will two tone like “tick, tick” to inform. Unplug the USB disk after the backlight is off. Plug the USB disk in the computer and run the management software. Click [Data Acquisition] – [USB Disk Acquisition], and find the plate number file through the browser. Click [OK]. You can query in [Traveling Record] after the data was imported successfully.

5. View the collected data

In [Traveling Record], you can view [Driving Record], [Doubtful Accident Data], [Speeding Record], [Fatigue Driving Record], [Accumulative Mileage], [Driver’s Month Mileage], [Vehicle’s Month Mileage]

Click [Traveling Record] and double-click to view “curve chart of general speed record” and “data list of general speed record”. Click [Doubtful Accident Data] and double-click to view

“curve chart of doubtful accident data” and “list of doubtful accident data”. Click [Speeding Record] to view information such as which driver did not speed, the maximum speed, the start time and end time of speeding, etc. Click [Fatigue Driving Record] to view whether or not there is fatigue driving, and the start time and end time. Click [Accumulative Mileage] to view the total mileages, accumulative mileage of 360 hours and accumulative mileage of two calendar days at the end of the acquisition time. Click [Operating Record] to view operating time, number of operations and detailed operations of the Recorder. Click [Driver’s Month Mileage] to view the accumulative mileage in a month of a driver. Click [Vehicle’s Month Mileage] to view the accumulative driving time in a month of a vehicle.

V. Technical Parameter

- Working Volt: 12/24V DC
- Working Current: Normal situation: <80mA
- Storage Temperature: -40 °C ~ +85 °C
- Working Temperature: -20 °C ~ +70 °C
- Vehicle Speed Range: 0 ~ 255 Km/h
- Speed Error: Maximal Error 0.5 Km/h
- Mileage Error: the resolution of Mileage exceed to 0.1 Km
- Time Error: Errors on running time for continuous record 24hours is -2.3s
- Record Capacity: 360hours running data (collection data on 5 per times/sec., save one data per minute
- Data Storage: The data can be saved for 5 years, when the main unit cut off the power.
- Dimensions: Panel size 188mm*57.6mm
Back panel: 175mm (Length)*50mm (Height)*113mm (Width)

VI. Frequently Asked Questions

1. Q: Does the installation of traveling data recorder affect the use of vehicle?

A: The installation only needs a set of wires by parallel connection to the vehicle. If the connection is correct according to the requirements, and the wires are well bind up and there is no short-circuit leakage, the installation will have no bad effect.

2. Q: There is a difference between the current time and the time displayed in the LCD. How should I do?

A: Run the management software, calibrate the displayed time on the vehicle traveling recorder by RS232 or management USB disk.

3. Q: When the recorder is working, , there are many prompt tones. What do they mean respectively?

A: After been electrified and the self-check is successful, the recorder will sound a tone like “tick--”; when operations of data acquisition, setting driver and vehicle information succeed, the recorder will sound two tones like “tick, tick”; when speeding, there will be two tones per second;

one tone every two second before fatigue driving and one tone per second after fatigue driving.

4. Q: Why the USB disk can not collect data or set parameters?

A: Generally, it is because of too much file fragmentation in the USB disk or wrong format. Backup your files in the USB disk and format the USB disk with FAT format, and then collect data or set parameters.

5. Q: Why the LCD of the Recorder can not display after been connected to power?

A: First, check if connection to vehicle power supply is wrong or reversed. Then, check the power fuse (if it is damaged, replaced it with fuse of $\Phi 5 \times 20$ 3A). Finally, connect it to another recorder to check, if the display is normal, please contract to a local distributor.

6. Q: Why the LCD cannot display speed when the vehicle is running?

A: If the vehicle speed meter does not work, it is generally because of the failure of vehicle speed sensor in gearbox. A simple and easy way to find the speed wire: when the vehicle is running, connect the blue wire of the recorder (No. 10) with a testing needle, and then contact the wire of mileage meter with the end of the testing needle to see if there is a speed display in the recorder. (Note: As for a small number of LCD, the speed display is normal after connected to the recorder, but the vehicle speed meter does not work. When encountering this kind of situations,

please contact us.)

VII. After-Sales Service

After-sales Service

1. In the warranty period of this product: all repairs are free of charge within 12 months from the date of purchase;

2. In event of product failure under normal operations within three months from the date of purchase, the company will replace it with a new product of the same model.

The Company provides on-line remote technical support services free of charge;

3. The following conditions are not within the warranty, but the company will provide maintenance services and certain amount of cost fee may be charged for that accordingly:

- a) Damages due to human factors;
- b) Damages due to disobeying this Manual;

c) Damages due to such force majeure factors as natural disasters and lightning strike etc.

In order that we can provide better service, please keep the Warranty safe.

Warranty

Customer Name			
Registration No.		Date of Purchase	
Product No.		Model	
Characteristic Coefficients		K Value	
Warranty Date	Content of Warranty		