TENSORTEC 腾视

Vehicle intelligent terminal

MV03

User Manual

Disclaimer

This manual is applicable to the onboard intelligent video terminal.This manual may contain technical inaccuracies or misprints.The contents of this manual will be updated irregularly without prior notice.The updated content will be added in the new version of this manual, we will improve or update at any time.The products or procedures described in this manual.If the description of the product in the manual is inconsistent with the real product, the real product shall prevail.Important safeguards and warnings:

1) Electrical safety

All installations and operations shall comply with local electrical safety codes.

2) Transportantion

In the process of transportation, storage and installation, heavy weight compression, violent vibration, impact and splash are not allowed.

3) Installation

Install equipment as required and handle with care.Do not press hard before the on-board intelligent video terminal is installed.

4) Engineering and technical personnel requirements

All inspection and maintenance work shall be carried out by qualified engineers.We are not responsible for any problems caused by unauthorized modifications.

5) Environmental requirement

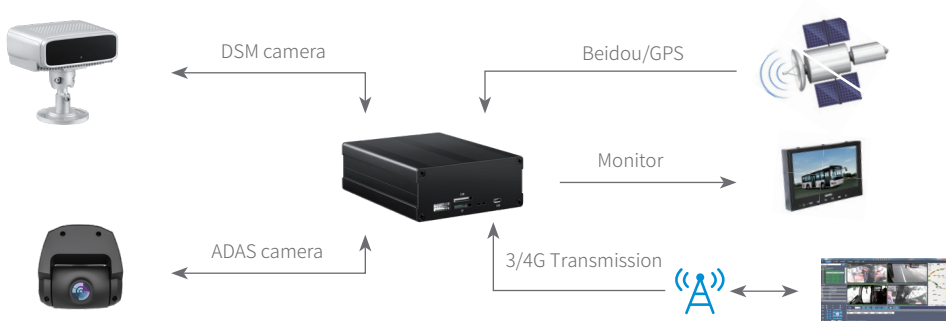
MV03 equipment and accessories shall be installed and stored in a cool, dry place;Avoid direct sunlight;Avoid storage with inflammable and explosive materials

Product introduction

This product is a cost-effective and extensible device specially developed for vehicle video surveillance. Built-in our company independently developed image intelligent processing core algorithm, real-time collection of driver fatigue status, driving calls, driving smoking, looking left and right, and other features using dedicated camera, while integrating a dedicated ADAS advanced auxiliary system, with the functions of forward collision warning, lane departure warning, etc.. the system uses high-speed processor and combines advanced H. 264 video compression and decompression technology and network technology in the field of IT with embedded operating system. It can realize video recording in HD, analog HD720P, and integrate wireless data upload in 4G, debug through Wi-Fi connect to Phone application, The product

adopts modular design, which has the characteristics of high reliability, flexible installation and convenient maintenance.

Working flow



Local Video and Playback Function: Resolution 720P
Network function: support real-time transmission of 4G network, remote alarm, parameter setting and over the air upgrade.
Equipment Upgrade: Support local upgrade and OTA upgrades/remote upgrade.
DSM Function: Fatigue warning, distraction warning, smoking warning, phone call warning, driver abnormal warning and other functions.
ADAS Function: Forward collision warning (FCW), Lane departure warning (LDW) etc.

Product Specification

	Parameter Types	Requirements	Remarks
DSM module parameters	Camera Resolution	AHD720p	Default
	Focal length	3.6 mm	
	Aperture number	F2.3	
	Perspective	75°	
	Working Distance	60-120CM	
	Working Condition	Day and night(all-weather adaptation)	
	Detection of facial patterns	All face types,including wearing glasses (sunglasses, myopia)	
	Scope of detection	Face, eyes, head, gesture	
	Fatigue accuracy	99.2%(wearing glasses:97.4%), for more than 1.5 seconds	Accuracy is based on actual measurement.
	Distraction Accuracy	98.2% lasts more than 3 seconds	
	Smoking Accuracy	98% lasts more than 3 seconds	
	Calling Accuracy	98% lasts more than 3 seconds	
DVR Hardware Parameter	Project	Parameters	Specification
	System	Operating Language	Chinese/English
		Operating System	Android
	Video Input/Output	Video Standard	ISO14496-10,AHD
		Image Compression	H.264 main profile
		Video Input	2 CH Video Input
		Video Output	1CH HDMI Output

DVR Hardware Parameter	Video Input/Output	Video Display	Single Screen,Double Screen Synchronize Channel display
		Video Compression	H.264 Main profile
	Audio Input/Output	Audio Input	1 CH Audio Input
		Audio Bit Rate	40Kbit/s
		Audio Output	1 CH Audio Output
	Video Audio Coding	Video Coding Resolution	Analog HD 720P
		Dual-Stream Video	Mainstream video, sub-stream 4G network transmission
	Videotape	Storage Medium	Main Memory:TF Card,Single card support max. 128G Slave Memory:USB External
		Video Recording Mode	Boot/Alarm event recording
		Video playback	PC-side playback analysis software playback
		WIFI	IEEE 802.11
	Satellite Positioning	GPS/Beidou	GPS Positioning,GPS/Beidou Dual Module
		Cold Start	Less than 42s
		Hot Start	Less than 2S
		Location accuracy	Less than 15m
		Acquisition sensitivity	-144dBm

DVR Hardware Parameter	Satellite Positioning	Tracking sensitivity	-159dBm
	Communication	2G/3G/4G	all Netcom
	External interface	Communication interface	USB 2.0 x 2,RS232 x 1,RS48S x 1
		Network interface	WIFI,RJ45 Interfacex1,10M/100M
		Audio	8Ω/1W
	Working Parameters	Power input	DC:+9V ~ +36V
		Power Output	+12V/1A
		Working Current	Less than 12w
	Structure	Size	119.5*97*40.4mm
	TF card	Supports Class 4-10, FAT32 format and 128G single expenses.	
	Software upgrade	Supports local U disk upgrade and remote upgrade	
ADAS Parameters	Parameter Types	Requirements	Remarks
	Camera Resolution	AHD720p	Default
	Focal length	4.3 mm	
	Detection range	Front 100M,left and right 5M	
	Working Condition	Day and night(all-weather adaptation)	
	Forward Collision Warning	1.5-2s warning before collision, the accuracy rate is more than 99%	
	Lane Departure Warning	Accuracy of multiple road types and lane color is 99%	

Environmental characteristics	Applicable environment	Detailed Parameters		Remarks	
	Operating temperature	-30°C ~ +70°C			
	Storage temperature	-40°C ~ +85°C			
	Relative humidity	5% ~ 95% (no frost)			
Interface definition	16 Pin Extension Cable Interface	No.	Color	Function	Remarks
		1	Red	BAT	Power Positive
		2	Black	PGND	Power negative
		3	Orange	ACC	ACC switch cable
		4	Purple	IO_IN_Right Direction	High:Valid (9-28V)
		5	Brown and white	IO_OUT1	
		6	Brown	IO_IN_Left Direction	High:Valid (9-28V)
		7	White	IO_OUT2	
		8	Black and White	GND	
		9	Sky Blue	232_RX	
		10	Blue	232_TX	
		11	Pink	VCC_OUT	
		12	Black and White	GND	
		13	Brown	485_A	
		14	Gray	485_B	
		15	Green and White	CANI_H	
		16	Green	CANI_L	

Interface definition	DSM Camera Interface	1	Red	DSM_AHD_VCC	7 Pin DSM aviation head interface,DSM signal input.
		2	Blue	DSM _Audio_IN	
		3	Yellow	DSM _AHD_IN	
		4	Black	GND	
		5	White	SP+	
		6	Green	SP-	
		7	Purple	LED	
	ADAS Camera Interface	1	Red	12v Output	7 Pin ADAS aviation head interface, ADAS camera input (4Pin to 7 Pin converter cable)
		2	Black	GND	
		3	Blue	IO_Reserved	
		4	Green	AHD_IN	
	USB Interface	1	Black	GND	4 Pin aviation head
		2	Green	D+	
		3	White	D-	
		4	Red	VCC	
	Monitor Interface	1	HDMI interface	AVOUT	Mini HDMI interface

Front Panel	Interface	Name		Description	
	USB Interface	Micro USB		Serial Port communication,Software Upgrade and Video Export	
	SIM Slot	Micro SIM		SIM card socket for SIM card insertion	
	Storage Card1	TF Card		TF card socket, mainly used for the storage of audio and video files and upgrade for DSM and ADAS	
Accessories Requirement	Standard Accessories			Optional Accessories	
	No.	Name	Qty	No.	Name
	1	Vehicle Video Terminal	1PCS	1	Monitor
	2	ADAS Camera	1PCS	2	TF Card 1 pcs
	3	GPS/BD Antenna	1PCS	3	WIFI Antenna
	4	4G Antenna	1PCS	4	4G SIM Card
	5	DSM Camera	1PCS	5	USB Connector
	6	User Manual	1PCS	6	HDMI Cable
	7	Warranty card	1PCS		
	8	Certificate	1PCS		
	9	3M adhesive	1PCS		
	10	16 Pin Extension Cable	1PCS		
	11	Rolling Belt	3PCS		

Function Description

No.	Function	Status	Function Description	Remarks
1	Boot self-check or Post	Support	1. Indicate the relevant working status through the equipment indicator.	
2	Real-time location upload	Support	1. To upload device real-time location information to the platform at a certain time interval (default 10 seconds)	
3	Alarm broadcast	Support	1. Dispatch information or other prompt driver information is sent through the 4G network, and the terminal receives it and broadcasts it through TTS voice. 2. When ADAS or DSM detects the driver's abnormality, it can broadcast the corresponding voice to remind the driver. For example, do not drive tiredly, keep safe distance, etc.	
4	Alarm function	Support	1. Forward Collision Warning, Lane Departure Warning; 2. Fatigue Warning, Calling Warning, Smoking, Warning, Distraction Warning; 3. Power off warning. 4. DSM module abnormal alarm 5. ADAS abnormal alarm	
5	Delayed shutdown	Support	1. When the main power supply of the equipment is disconnected, it can satisfy at least 5S automatic video recording.	

6	Blind area re-transmission	Support	1. The equipment automatically stores the position data in the place of signal weakly and automatically transmits the position information while there is a signal.	
7	Fatigue Warning	Support	When the device works normally: 1. When the vehicle speed is greater than 30 km/h, once driver's eyes in the state of abnormally closed last for over 4s was detected by DSM camera, there will be an alert created which called fatigue driving; 2. When an alarm is generated, the device immediately transmits the fatigue driving alarm status and picture information to the monitoring platform through the 4G communication module.	
8	Distraction Warning	Support	When the device works normally: 1. When the vehicle is running and the speed is greater than 30 km/h. once driver looking around over 5s is detected through the DSM camera, there will be an alarm generated which is called distraction warning. 2. When an alarm is generated, the device immediately transmits the distraction alarm status and picture information to the monitoring platform through the 4G communication module.	
9	Smoking Warning	Support	When the device works normally: 1. when the vehicle speed is more than 30 km/ h during the running, once the DSM camera detects driver continuous 2 seconds smoking state, and the alarm is generated; 2. When the alarm is generated, the device transmits the smoking driving alarm information through 4G module, and the alarm information includes alarm status and picture information to the monitoring platform.	
10	Calling Warning	Support	When the device works normally: 1. when the vehicle speed is more than 30 km/ h during the running, once the DSM camera detects driver continuous 3 seconds calling state through detecting driver's hand posture, and the alarm is generated;	

			2. When the alarm is generated, the device transmits the calling driving alarm information through 4G module, and the alarm information includes alarm status and picture information to the monitoring platform.	
11	Lane Departure Warning (LCW)	Support	1. Once the speed is or over 50 km/h, when the driver inadvertently deviates from the l ane and presses the white lane line and the duration lasts for 2 seconds and an alarm is generated. 2. When an alarm is generated, the device transmits the lane departure alarm information through the 4G module, and the alarm information includes the alarm status and picture information to the monitoring platform. 3. If the device connects to the left and right turning signals of the vehicle, when the driver turns left or right direction, the device no longer generates lane departure warning.	
12	Forward Collision Warning (FCW)	Support	1. Once the speed reach 50 km/h, when the relative speed of the vehicle and the vehicle ahead is a little bit fast, distance between the two vehicles may cause an imminent rear-end collision with the vehicle ahead last for 2 seconds. Forward collision alert is generated. 2. When an alarm is generated, the device transmits the forward collision warning information through the 4G module, and the alarm information includes the alarm status and picture information to the monitoring platform.	
13	APP Debugging		1. DSM Parameters setting and Calibration 2. ADAS Parameters setting and Calibration 3. Test mode switch 4. Volume 5. System parameter configuration and adjustment 6. Add switch for each of warning function. 7. Terminal device parameters adjustment (IP, Port, Terminal No., Plate) 8. Manager parameters adjustment(IP, Port)	

Equipment Installation

1. Notices:

1). Comply with all electronic product specifications, vehicle and other connecting equipment requirements when installing and operating equipment.

2). Power supply and ground:

a) Use DC power supply for video recorder. Please pay attention to the positive and negative polarity when connecting power supply.

b) The input voltage range of the DVR is 9 V-36 V. Do not connect to the power supply beyond this range. If the voltage is too low, the vehicle video recorder will not work properly, and if the voltage is too high, the vehicle video recorder will be damaged.

c) It is suggested that the vehicle video recorder should be connected directly to the battery power output. Please note that do not connect to the engine power output, because the engine output may produce instantaneous high voltage at start-up, which will damage the on-board video recorder.

d) Even if the equipment is turned off, the machine is electrified, to avoid short circuit, disconnect the power supply of device before connecting other external devices.

e) Connect the ground wire of the equipment correctly to the ground wire of the vehicle to form a loop.

f) If you do not use the machine for a long time, it is best to completely disconnect the power supply of the equipment to extend the service life.

g) It is recommended to put a wear-resistant, heat-resistant, waterproof and oil-proof casing on the outside of the power cord to prevent short-circuit or open circuit due to long-term vibration and friction on the vehicle.

3). Humidity requirements:

a) Install equipment in a dry environment to avoid moisture, dripping, water spray, etc. Do not install the device in a place where it may accumulate water or a wet place where liquid will drip.

b) Do not touch the device with wet hands, or touch the device while standing in the water or in contact with other water sources, because there is a risk of electric shock.

2. Installation

DVR Main device installation

1). In order to extend the life of the equipment, please install the equipment as far as possible in the part where the vehicle vibration is weak.

2). Device should be installed at the place with good ventilation: please keep the distance at least 6 inches(15 centimeters) away from other device to facilitate the circulation and heat dissipation of the air; it shouldn't be installed in the confined space(such as rear trunk of the vehicle).

3). The external wiring of the equipment should be adequately spaced and protected by a flame-retardant tube to ensure that the wire is not bent or leaks due to vibration and wear.

4). Make sure that the device is away from the heat source on the vehicle. There should be no sundries around the device. It is strictly forbidden to place any items on the device.

5). The equipment can only be installed horizontally or laterally (if there are installation requirements in other directions, please consult the manufacturer first). Any other angle of installation may damage the equipment and is strictly prohibited.

6). Insert sim card and TF card accurately as indicated on the device.

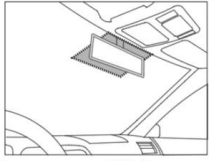
Installation of DSM and ADAS cameras

1. Installation position

The DMS camera needs to be installed under the left side of the A pillar of the vehicle as follow:

and the ADAS camera needs to be installed on the front windshield.

For trucks/buses 大车上



For passenger cars 乘用车上

2. Distance requirement

The distance between driver's head to camera is within 50cm-120cm.

3. Installation mode

Glue the ADAS camera to the front windshield and fix the DSM camera at the car body by screw(or glue the DSM camera,it depends on the camera type).

DSM and ADAS Camera Calibration

1. Connect device

Usually, we use mobile application to debug DSM and ADAS installation angle.

1) Install an application“Calibrator”to android system phone.

(This app is developed by our company, only works on android system phone).

2) Open the Calibrator, click the right bottom button “Mine” on

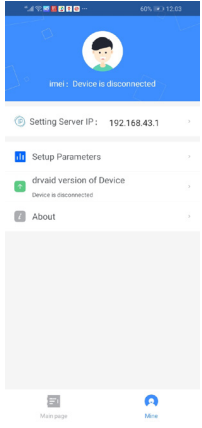
your phone, select the server IP 192.168.43.1 as shown below:

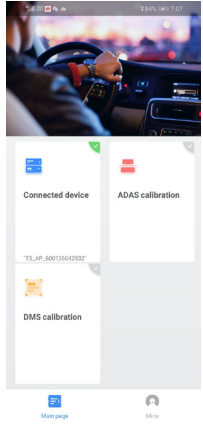
3) After the device is started, the mobile phone search WIFI

which is called "TS-AP-Equipment-xxxxx",enter password 123456789 to connect the device.

4) Go back to Calibrator, click Connect Device (TS-AP-SN), You

will get a little blue tick at the top of Connect device area if connection is successful.

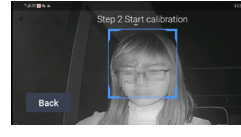




2. DSM Calibration

1) Click DSM calibration, it will take you to the camera position correction page, DSM is recommended to be installed at the left front of the driver, under the A pillar. (Different type of vehicle has different installation position). Adjust the camera position slightly make sure your face is at the center of the screen inside the blue rectangle frame, you might get “calibration is successful” notification on the screen.

2) If you don’t get success in the first step, click Next to start calibration, adjust the camera angle and calibrate. You will get “calibration is successful” notification on the screen.



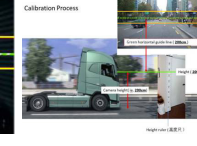
3) Fix the camera firmly to avoid that the installation angle is changed by external force.

Notice: Hands on the steering wheel cannot block the face；

3. ADAS Calibration

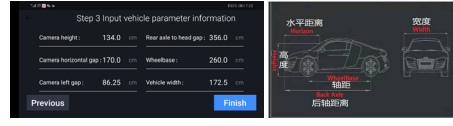
1) Click ADAS Calibration, you will get Adjust ADAS camera position page , adjust the camera angle to locate the horizon line between the two yellow guiding lines, make sure the middle line coincides with horizon line, go to the next step. (Measure the height from the ADAS camera to the ground. Find an equal height reference 3 to 5 meters in front of the vehicle, make sure the green line of the debug screen coincides with it by adjusting camera lens.)

Horizon/Vanish line calibration



2) Calibrate vanishing point position, move the blue cross so that the center point of the cross coincides with horizon line. You can use the four direction arrow to adjust slightly, and then go to the next step.

3) Set the parameters information according to your vehicle. After setting, click Finish.



Camera height: the height from camera to ground

Camera horizon gap: the distance between camera and engine hood

Camera left gap: the distance from camera to the left of the vehicle

Rear axle to head gap: the distance from back axle to hood

Wheelbase: the distance between 2 wheels

Vehicle width: the width of the vehicle

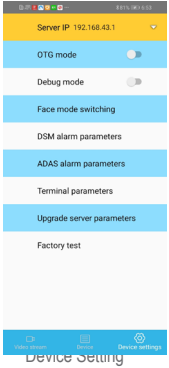
4. Parameter setting

1) Open the debugging assistant app tsAide.

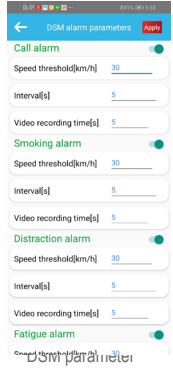
2) Connect to the hotspot of the device , the hotspot name is TS-AP-SN, and the password is 123456789; then return to the interface on the phone, friendly reminder: please turning on all permissions during the installation process.

3) After connection successfully, return to the main interface.

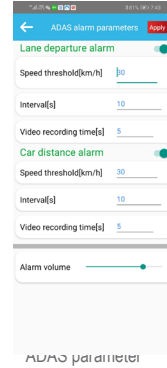
4) Click Device setting at the bottom of the screen, it will take you to next page, you can set the debugging mode, DSM alarm parameters, ADAS alarm parameters, terminal parameters, and Manager parameters. When setting terminal parameters, the mobile phone number must be 12 digits. If there is only 11 digits, please add 0 in front. This No. is the ID of this device on the server. Please contact us before you change it.



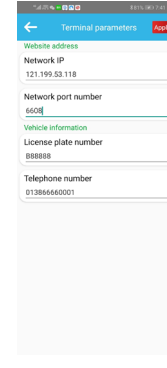
Device Setting



DSM parameter



ADAS parameter



5. Wiring connection method:

1) Power cable connection method:

Open the cover of the car safety box and measure the voltage with a multimeter. As shown in the figure, the range of the voltage of the car power supply is between DC11V and 13V. (The multimeter red pen is positive and the black pen is negative.) Find out the positive and negative poles of the power supply.

Description: Normal power supply means that no matter whether the car key is inserted or not, as long as the battery has electricity, this wire has electricity;

ACC line:

refers to the key from ON to ACC, this line has no electricity, after the key has been screwed to ON, this line has electricity.

Connection method:

The positive pole (red) of the power supply is directly connected to the positive pole of the automobile battery(power), the negative pole is connected to the negative pole of the automobile battery (i.e. touch iron); the ACC line (yellow) is connected to the ACC line of the automobile.

After the connection is completed, junction point should be wrapped with insulating tape to avoid electric shock and damage of equipment caused by short circuit.

When the line passing through the corner, connection part or other places of the vehicle, the outer skin of the conductor should be insulated and wrapped with insulating tape, so as to avoid long-term friction between the conductor and the car, resulting in the wear and tear of the protective adhesive tape of the conductor ,which might cause short circuit.

Friendly Reminder:

In principle, the first option of power supply is the reserved power of the automobile, and the second is the power of the automobile media audio or cigarette lighter, as these power supply will not affect other configurations of the automobile. Avoiding wrong wiring can lead to many minor faults.

2) Install GPS antenna

Make sure you don't switch on the equipment power first!

a) The arc side of the GPS antenna face the sky, and there is no metal shielding and electromagnetic shielding above.

b) In order to receive good signal, the flat bottom of the GPS antenna should be installed as flat as possible, and the angle should not exceed 45 degrees.

c) The wiring is as concealed as possible: first, it is beautiful; second, it is to prevent unintentional or intentional damage.

d) Suggested installation location of GPS receiver: under the front windshield or under the rear windshield.if it can be installed on the top of the car, the receiving effect is the best;

e) Generally, the GPS antenna interface on the left side of the device is in silver, and the GPS antenna interface is also in silver!

3) Install 4G antenna

Make sure you don't switch on the equipment power first!

a) To avoid signal being interfered, the 4G antenna should keep distance from other cables.

b) To avoid the interference between 4G signal and the wireless devices in the car (such as radio), it is suggested that the distance between the 4G antenna and these devices should be further than 50 cm.

c) Suggested installation location of 3G/4G antenna: concealment place such as under the front windshield, under the seat or under the panel ,under the rear windshield.

d) It is better that do not put the unit ,the 4G antenna, the GPS antenna together, and try to keep the distance above 20 centimeters at least.

e) The 4G antenna can be fixed by double-sided glue or velcro. The antenna connector should be tightened to avoid the looseness of the connector caused by long-term vibration, which might affect the signals reception and transmission.

6. Appendix:

1) Common Questions and Answers

Q:What should I do if the product has problems that I can't handle?

A:please record the product model and software version number, submit detailed problem description, phenomenon, picture to our technical support engineer for analysis. The more detailed you describe, the more convenient it will be for us to analyze and process.

Q: What if the on-board device does not have a video output?

A: Check the connection status of the host video output line and the display.

Q: the device is turned on and the TF card has been inserted successfully, but it doesn’t record?

A: check that the SD card is in good contact

Q: The GPS module exists,but has no coordinate information.

A:1. Check whether the GPS antenna is broken or not, and whether it connects well or not.It is recommended to install it in a place with strong signal. Note that some car glass shielding film will block the GPS signal.

2. If it is tested in the room,the GPS signal is shielded or weak. It is recommended that the GPS antenna be placed outdoors or outside of the window.

Q: GPS geographical location in the map shows deviation?

A: If the GPS module is already positioned, the signal is valid. There are many reasons for the deviation, such as:government restrictions, error tolerance, GPS signal interruption, etc. The actual map will deviate a little for safety reason. The general this kind of problem can be solved by using GPS correction.

Q: The device is not online on the platform?

A: Please check whether the 4G antenna connect well or not. If the signal is too weak, it may not be able to dial successfully; in addition, check if the SIM card has enough flow. If there is no flow, the device will not be able to go online.

2) Troubleshooting:The device is not online

a) Check whether the device terminal number is correct or not. Enter 12 digits terminal number according to the platform, set IP and port correct correctly.

b) Check whether the 4G signal of the device is normal. If there is no signal, change a place and look at the signal. If there is no 4G signal, there may be a problem with the SIM card.

c) Check the information on the platform.

d) If the device does not go online, please check whether the SIM card is installed and the installation is abnormal or not (usually the chip side is in upward direction), check whether the SIM card has enough flow, if the card expires or the card is stopped, the device will not go online.

e) After all the above problems have been checked, the problem cannot be solved. Please connect customer support for further help.

3) Troubleshooting:

The device can not be located

a) Check whether the antenna is inserted incorrectly or not, the GPS antenna is in silver, and the 4G antenna is in golden. If the two antennas are inserted incorrectly, it will affect whether the device is positioned.

b) Check whether the GPS antenna is damaged or broken.

c) Replace the GPS antenna (the device positioning after replacement may be caused by the GPS antenna itself).

d) Check whether the GPS antenna installation position is blocked by other shields. If there are multiple devices having same problem in the area, after installing the device, drive the vehicle out of this area and see whether the equipment will be positioned.

e) Check whether there are other equipment installed inside the vehicle or not, to avoid interference between the two antennas, keep a certain distance between 2 antennas at least 30 cm. (The installation area might have other large equipment installed ,it might cause the GPS signal Interference).

f) After all the above problems have been checked, the problem cannot be solved. Please connect customer support for further help.

FCC Warning

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any inte rference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interferenceto radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Shenzhen Tensor Technology Co., LTD

Cell: 0755-2692 3813
Email: support@tensortec.net
Website: www.tensortec.net
Address: 5th Floor, Shunhengli Building, No.118 Xin'an 3rd Road, Bao'an District,Shenzhen, Guangdong Province,China