KT720

en User manual

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1. Symbols used

1.1 In the documentation

1.1.1 Warning notices - Structure and meaning

Warning notices warn of dangers to the user or people in the vicinity. Warning notices also indicate the consequences of the hazard as well as preventive action. Warning notices have the following structure:

Warning symbol	**KEY WORD – Nature and source of hazard!** Consequences of hazard in the event of failure to observe action and information given. ➢ Hazard prevention action and information.

The key word indicates the likelihood of occurrence and the severity of the hazard in the event of non-observance:

Key word	Probability of occurrence	Severity of danger if instructions not observed
DANGER	**Immediate** impending **danger**	**Death** or **severe** injury
WARNING	**Possible** impending **danger**	**Death** or **severe** injury
CAUTION	Possible **dangerous situation**	**Minor** injury

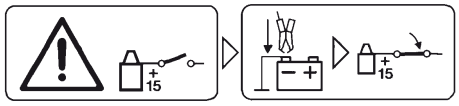
1.1.2 Symbols in this documentation

Symbol	Designation	Explanation
!	Attention	Warns about possible property damage.
ℹ	Information	Practical hints and other useful information.
1. 2.	Multi-step operation	Instruction consisting of several steps.
➢	One-step operation	Instruction consisting of one step.
⇨	Intermediate result	An instruction produces a visible intermediate result.
➜	Final result	There is a visible final result on completion of the instruction.

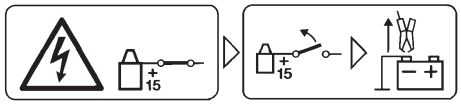
1.2 On the product

! Observe all warning notices on products and ensure they remain legible.

Danger - Measure the car without wire B- may cause electric shock!
When wire B- disconnects, measuring grounding car or battery negative may result in somatic damage, cardiac failure or death caused by electric shock.
➢ In the all measurements, KT720 connects with vehicle grounding wire or battery negative through wire B-.
➢ Note the following order of connection.



Be care
1. Turn the ignition off.
2. KT720 connects with battery(B-) or engine grounding.
3. Turn the ignition on.



Be care
1. Turn the ignition off.
2. KT720 disconnects with battery(B-) or engine grounding.Important notes

Danger-Measure high voltage may cause electric shock!
Measure voltage above 100V may cause somatic damage, cardiac failure or death.
➢ Through CH1,CH2,CH3,and CH4 can only measure voltage less than 60V DC/30V AC.
➢ Through CH1,CH2,CH3,and CH4 can not measure power voltage or similar power network voltage.

Waste Disposal
Waste electrical/electronic devices, including circuits, parts and battery, should disposal separately with household refuse.

2. Important Notice

Before start up, connecting and operating Bosch products it is absolutely essential that the operating instructions/ owner's manual and, in particular, the safety instructions are studied carefully. By doing so you can eliminate any uncertainties in handling Bosch products and thus associated safety risks upfront; something which is in the interests of your own safety and will ultimately help avoid damage to the device. When a Bosch product is handed over to another person, not only the operating instructions but also the safety instructions and information on its designated use must be handed over to the person.

2.1 User group

The product may be used by skilled and instructed personnel only. Personnel scheduled to be trained, familiarized, instructed or to take part in a general training course may only work with the product under the supervision of an experienced person.

All work conducted on electrical and hydraulic devices may be performed by persons with sufficient knowledge and experience in the field of electrics and hydraulics.

Children have to be supervised to ensure that they do not play with the appliance.

2.2 Agreement

By using the product you agree to the following regulations:

Declare

- Refer to packing list for detailed product configuration;
- Refer to software for functions, pictures.

This product cannot use in:
Locations characterized by a separate power network, in most cases supplied from a high- or medium-voltage transformer, dedicated for the supply of installations feeding manufacturing or similar plants with one or more of the following conditions:
– frequent switching of heavy inductive or capacitive loads;
– high currents and associated magnetic fields;
– presence of Industrial, Scientific and Medical (ISM) apparatus (for example, welding machines).

The equipment complies with relevant requirements of Directive 2004/108/EC for Electromagnetic compatibility (EMC) and Directive 2006/95/EC for Low Voltage.

CE only for KT720 device

Copyright

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Liability

All data in this program is based - where possible - on manufacturer and importer details. Bosch does not accept liability for the correctness and completeness of software and data; liability for damage caused by faulty software and data is ruled out. Whatever the event, Bosch liability is restricted to the amount for which the customer actually pays for this product. This disclaimer of liability does not apply to damages caused by intent or gross negligence on the part of Bosch.

Warranty
Any use of non-approved hardware and software will result in a modification to our product and thus to exclusion of any liability and warranty, even if the hardware or software has in the meantime been removed or deleted.

No changes may be made to our products. Our products may only be used in combination with original accessories and original service parts. Failing to do so, will render null and void all warranty claims.

This product may only be operated using Bosch approved operating systems. If the product is operated using an operating system other than the approved one, then our warranty obligation pursuant to our supply conditions will be rendered null and void. Furthermore, we will not be held liable for damage and consequential damage incurred through the use of a non-approved operating system.

2.3 Obligation of contractor

The contractor is obliged to ensure that all measures geared towards the prevention of accidents, industrial diseases, labor-related health risks are taken and measures towards making the workplace fit for people to work in are carried out.

Specifications for electrical systems (BGV A3)
Electrical engineering in Germany is subject to the accident prevention regulations of the trade association "Electrical Plant and Equipment as under BGV A3 (previously VBG 4)". In all other countries, the applicable national regulations acts or decrees are to be adhered to.

Basic rules
The contractor is bound to ensure that all electrical equipment and operating material is set up, modified and maintained by skilled electricians only or under the guidance and supervision of a skilled electrician in accordance with electrical engineering principles.

Furthermore, the contractor must ensure that all electrical equipment and operating material is operated in keeping with electrical engineering principles.

If a piece of electrical equipment or operating material is found to be defective, i.e. it does not or no longer complies with electrical engineering principles, the contractor must ensure that the fault is rectified immediately and, in the event that imminent danger exists, also ensure that the electrical equipment or the electrical operating material is not used.

Tests (taking Germany as an example):

- The contractor must ensure that all electrical systems and equipment are tested by a qualified electrician or under the guidance of a qualified electrician to ensure they are in proper working order:
  - Before starting for the first time.
  - After modification or repair before starting for the first time.
  - At given intervals. Set intervals such as to ensure that faults that can be expected to occur are determined in good time.

- The test is to take the electrical engineering principles relating hereto into account.

- Upon request of the trade association, a test manual is to be maintained into which specific entries are made.

3. Safety instructions

3.1 Risk of electric shocks

3.1.1 Low voltages, high voltages

Hazardous voltages occur in both the lighting system and the electrical system of a motor vehicle. If contact is made with live parts (e.g. with the ignition coil), there is a risk of electric shock from flashover voltages caused by damaged insulation (e.g. ignition cables which have been attacked by martens). These apply to the secondary and primary sides of the ignition system, the wiring harness with connectors, lighting system (Litronic) as well as connection to the vehicle.

Safety measures:
- ➢ Only connect to a properly grounded outlet.
- ➢ Only the enclosed or a tested power supply cable is to be used.
- ➢ All extension cables must be fitted with shock-proof contacts.
- ➢ Any cables with damaged insulation must be replaced.
- ➢ First connect the lighting system and turn it on before connecting it to the vehicle.
- ➢ Before switching on the ignition connect the (B-) cable to engine ground or the battery (B–) terminal.
- ➢ Always switch off the ignition before performing any work on the electrical system of the vehicle. Intervention includes, for instance, connection to the vehicle, replacement of ignition system components, removal of equipment (e. g. alternators), connection of equipment to a test bench.
- ➢ Wherever possible, tests and settings should always be caried out with the ignition switched off and the engine stationary.
- ➢ If tests or settings are carried out with the ignition switched on or the engine running, care must be taken not to touch any live parts. This applies to all connection cables and leads as well as to connections of equipment to test benches.
- ➢ Test connections must always be made using suitable connectors (e.g. Bosch testing cable set or vehicle-specific adapter cables).
- ➢ Make sure that all test connections are properly plugged in and secure.
- ➢ Before disconnecting the (B-) cable from the engine ground or battery (B–), switch off the ignition.
- ➢ Never open the enclosures.

3.1.2 High voltages in hybrid vehicles and electric vehicles as well as their high-voltage components

If high-voltage components or high-voltage wires are inexpertly handled, there is a risk of fatal injury from high voltages and the possible transmission of current through the body.
- ➢ Deenergization is only to be performed by a qualified electrician, a qualified electrician for specific tasks (hybrid) or a power systems engineer.
- ➢ Work on vehicles with high-voltage components is only ever to be performed in a safe, deenergized condition by persons with the minimum qualification "Trained to perform electrical work".
- ➢ Even after deactivating the high-voltage vehicle electrical system, the high-voltage battery may still be live.
- ➢ Operating condition cannot be established from any running noise, as the electric machine is silent when stationary.
- ➢ In gear positions "P" and "N" the engine or electric motor may start spontaneously depending on the charge of the high-voltage battery.

Safety measures:
- ➢ Never open or damage high-voltage batteries.
- ➢ On accident vehicles, never touch high-voltage components or exposed high-voltage wires before deactivating the high-voltage vehicle electrical system.
- ➢ Avoid contact with any high-voltage components and high-voltage wires (orange sheathing) when in operation.
- ➢ Secure against unauthorized renewed start-up (e.g. by means of a padlock).
- ➢ Always wait at least 10 seconds after deactivating the high-voltage system.
- ➢ Visually inspect the high-voltage components and high-voltage wires for damage. The power systems engineer responsible should always be immediately notified of any irregularities, doubts or defects found.
  - High-voltage components must never exhibit signs of external damage.
  - The insulation of the high-voltage wiring must be intact and undamaged.
  - Watch out for any abnormal deformation of the high-voltage wiring.

3.2 Danger of acid burning

When exhaust gas measurements are taken, the ***sampling hoses*** which are used release a highly caustic gas (hydrogen fluoride) that can cause acid burning in the respiratory system when heated to temperatures in excess of 250 °C (482 °F) or in the event of fire.

Rules of conduct:
- ➢ Consult a doctor immediately after inhaling!
- ➢ Always wear gloves made of neoprene or PVC when removing residues left after a fire.
- ➢ Neutralize any residues left after a fire with a calcium hydroxide solution. This produces non-toxic calcium fluoride, which can be washed away.

Acids and alkalis can cause severe burning on unprotected skin. Hydrogen fluoride in combination with moisture (water) forms hydrofluoric acid. The ***condensate***, which accumulates in the sampling hose and in the condensate container likewise contains acid.

Rules of conduct:
- ➢ When replacing the O2 measuring sensor, bear in mind that it contains alkali.
- ➢ When replacing the NO measuring sensor, bear in mind that it contains acid.
- ➢ Rinse any affected parts of the skin immediately in water, then consult a doctor!
- ➢ NO and O2 measuring sensors are hazardous waste and must be disposed of separately. Your Bosch specialist equipper can dispose of sensors in the proper manner.

If fluid (electrolyte) escapes from ***batteries and rechargeable batteries***, avoid getting it on your skin or in your eyes.

Rules of conduct:
- ➢ If contact with skin or eyes happens nevertheless, wash the affected parts immediately with clean water and then consult a doctor.

3.3 Danger of injury, Danger of crushing

The vehicle has rotating and moving parts that can injure fingers and arms.

If the vehicle is not prevented from rolling away, there is a danger of people being crushed against a workbench, for example.

There is the risk with electrically operated fans in particular that the fan can start running unexpectedly even when the engine and ignition are off.

Safety measures:
- ➢ Take steps to prevent the vehicle from rolling away while it is being tested. Select the park position if the vehicle has an automatic transmission and apply the handbrake or lock the wheels with chocks (wedges).
- ➢ Operating staff must wear work clothes without loose bands and loops.
- ➢ Do not reach in any area with rotating or moving parts.
- ➢ When working on or in the vicinity of electrically driven fans, allow the engine to cool down first, then disconnect the plug of the fan motor.
- ➢ Route cables at a suitable distance from rotating parts.
- ➢ Secure the trolley against rolling away by setting the brakes.
- ➢ Do not place heavy objects on or lean on the sensor holder.
- ➢ Transport and operate the equipment only in accordance with the operating instructions.

3.4 Danger of burning

When working on a hot engine, there is a risk of injury from burning if such components as the exhaust gas manifold, the turbo-charger, the Lambda sensor, etc. are touched or if parts of the body come too close to them. These components may be heated to temperatures of several hundred degrees Celsius. Depending on the duration of the exhaust gas measurements, the sampling probe of the exhaust gas measuring instrument may also become extremely hot.

Safety measures:
- ➢ Always wear protective clothing, e.g. gloves.
- ➢ Allow the engine to cool down first. This also applies to auxiliary heating systems.
- ➢ Keep connecting cables well away from all hot parts.
- ➢ Do not leave the engine running any longer than necessary for the test or setting.

3.5 Danger of fire, Danger of explosion

There is a risk of fire and explosion from fuels and fuel vapors when work is performed on the fuel system or on the mixture control system.

Safety measures:
- ➢ Switch off the ignition.
- ➢ Allow the engine to cool down first.
- ➢ Avoid naked flames and potential sources of sparks.
- ➢ Do not smoke.
- ➢ Collect any leaked fuel.
- ➢ Always ensure effective ventilation and suction when working in closed areas.

3.6 Danger of asphyxiation

Car exhaust fumes contain carbon monoxide (CO) - a colorless, odorless gas. If inhaled, carbon monoxide causes an oxygen deficiency in the body. Extreme caution is therefore essential when working in a pit, as some of the components of the exhaust gas are heavier than air and settle at the bottom of the pit. Caution is also necessary when working on LPG-driven vehicles.

Safety measures:
- ➢ Always ensure effective ventilation and suction (especially when working in a pit).
- ➢ Always switch on and connect the suction plant in a closed area.

3.7 Danger of tripping

When conducting tests or making adjustments, the sensor and connection cables increase the risk of tripping.

Safety measures:
- ➢ Route the connecting cables such that any risk of tripping up is prevented.

3.8 Noise

Noise levels in excess of 70 dB(A) can occur when measurements are carried out on a vehicle, especially at high engine speeds. Damage to hearing may result if human beings are exposed to noise at such levels over an extended period of time.

Safety measures:
- ➢ Noise protection facilities must be provided by the owner at all workplaces in the vicinity of the testing area.
- ➢ Suitable personal noise protection facilities must be used by the operator.

3.9 WLAN (Wireless Local Area Network)

KT720 does not have wifi capabilities, the need for additional access a certified USB wifi module to achieve this function.

3.9.1 Important information on WLAN

WLAN stands for Wireless Local Area Network. As with Bluetooth, WLAN provides a radio link on the free 2.4 GHz ISM band (ISM: Industrial, Scientific, Medical). This frequency range is subject to government regulations, but may be used without a license in most countries. Consequently a large number of applications and devices employ this frequency band for transmission. This can result in frequency interference.
Depending on ambient conditions, the WLAN link may therefore deteriorate, e.g. in the case of Bluetooth links, cordless telephones, radio-controlled thermometers, radio-controlled garage door openers, radio-controlled light switches or radio-controlled alarm systems.

Bluetooth can lead to interference in the bandwidth of the WLAN network. The antennas of Bluetooth and WLAN devices should be at least 30 centimeters apart. Do not plug Bluetooth USB adapters and WLAN sticks into adjacent USB slots on PCs/laptops. Use the USB extension cable (special accessory) to maintain a distance between the Bluetooth USB adapter and the WLAN stick on the PC/laptop.

Exercise extreme caution if wearing pacemakers or other vital electronic devices when using radio systems, as proper functioning of these items could be impaired.

Note the following to ensure the best possible connectivity:

- The WLAN radio signal always tries to find the most direct path. When setting up the PC/laptop and access point (see section 2.6.2), make sure there are as few obstacles as possible (e.g. steel doors and concrete walls), which could interfere with the radio signal from and to the KTS 340. Inside buildings, the range of the WLAN is also greatly influenced by the construction materials used. Conventional masonry, wooden walls and certain types of dry construction wall scarcely impede radio waves. Thin gypsum walls can however cause problems, as considerable amounts of moisture may accumulate in the gypsum and result in the absorption of radio signals. Concrete (and in particular reinforced concrete) largely blocks out radio waves. Cellar ceilings are often impenetrable. Generally speaking, walls with a lot of installed metal (e.g. pipes, wires) obstruct radio waves.
- Radio reception is also impeded by large metal objects such as radiators and window frames as well as active sources of interference such as DECT telephones and microwave ovens.
- Have your network infrastructure installed and tested in advance by a data systems expert.
- Keep the SSID and the codes for the radio link in a safe place. Make sure these data are readily to hand in case faults occur.
- We recommend a thorough inspection of the premises on commissioning: Establish where in the building the VCI works properly and where the operating limits are.
- If the VCI is to be used in a vehicle, radio communication can be severely limited.
- The radio link is affected by weather conditions. The reception signal may therefore vary.
- Please contact your network administrator with any queries.

3.9.2 Information on access points

A wireless access point is an electronic device, which acts as an interface between a radio network and a cable-connected computer network. It provides a wireless connection between the KTS 340, the PC/laptop with ESI[tronic] Startcenter and a printer, for example.

We recommend using WLAN standard IEEE 802.11b (data transmission rate max. 11 Mbps) for the access point. The "extended range" function is not supported.

Please note the following:

- The access point should be located as centrally and high up as possible, ideally under the ceiling.
- The access point antenna should face downwards towards the floor.
- In the event of a poor connection it may be useful to change the set channel on the access point. If possible, avoid using neighboring channels to channels that are already in use.

- We recommend that encryption of radio communications is configured at the access point.

3.10 FCC Statement

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 interference to 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.

To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

MODIFICATION

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the device.

3.11 Satety Warning

- Inspection shall be carried out in good ventilation. Connect the exhaust pipe to outside if there is no enough ventilation;
- Smoking and open fire are prohibited in the inspection;
- The battery liquid contains sulphuric acid that could erode the skin. Avoid battery liquid from touching the skin directly in operation, especially note that the liquid shall not be splashed into eye;
- The engine temperature is high when running. Avoid touching the high-temperature parts, such as radiator and exhaust pipe;
- Pull manual brake before starting the engine. Block the front wheels and place shift lever at P or neutral gear to avoid accident when starting the engine;
- If external batter is used as power supply, pay attention to the electrode; use red alligator clip to connect anode and black alligator clip to connect cathode;
- Keep all the power cables, pens and tools away from belt or other moving parts if using instrument in engine compartment;
- Do not wear watch, ring and loose clothes in maintenance for engine compartment;
- Wear approved safety glasses in all inspection processes;
- Only the enclosed power adapter or power supply cable can be used for supply connection;
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Any parts of the device and its accessories are not allowed to be changed or replaced, other than authorized by the manufacturer or his agent.
- Check the equipment is in good working condition before use by testing it in a known voltage supply.
- Before touching conductive parts, the absence of hazardous voltage must be checked with the two-pole direct contact measurement of other equipment.
- Not to use the equipment for measurements on mains circuits, not to use the equipment for measu-

rements on voltage exceed the voltage range describe in the manual.

3.12 Using notes

- The instrument is precise electronic instrument, do not drop it.
- The instrument may respond slowly in first inspection. Please be patient. Do not operate the instrument frequently.
- Ensure that the instrument and the diagnosis retainer are connected securely, otherwise the interrupted signal will affect the test. If they can't be connected normally, pull out the connector and plug it again. Do not shake the connector in using.
- Use screw to fasten the connection wire and connectors to avoid disconnecting and damaging the interface. Hold the front end of the connector when pulling it. Do not pull the rear connection wire.
- Handle the instrument gently and put it in safe place to avoid impact. Shut off the power when not using.
- after using and put the accessories into the kit.
- Online upgrade will be affected by local wire speed. Please wait patiently if the loading is slow.
- Certain inspection and maintenance basis are required to operate the instrument, as well as electrical control system of the inspected automobile.

3.13 Notes for operation of automobile ECU

Pay attention to the following when diagnosing the automobile equipped with computer control system:

- Do not put the magnetic objects, such as radio loudspeaker near the computer, because the magnetism of the loudspeaker will damage the circuits and parts in ECU.
- Never switch off the internal electrical devices when the ignition switch is on. The self-induction of the coil when power-off will generate high instantaneous voltage that will damage the sensor and ECU.
- Special attention shall be paid to avoid damaging ECU and sensor when carrying out maintenance near the computer or sensor.
- Connect the ECU harness connector securely, otherwise it will damage the electronic units, such as integral circuit in ECU.
- Wear earthing metal strap with one end on the body and another end twisting finesse when repairing or approaching ECU-control digital instrument.
- Shut down ECU system power before welding on the automobile.
- Unless specified, do not test the electrical devices related to ECU with test lamp to avoid damaging ECU or sensor.
- Unless specified in test process, use digital instrument with high impedance to test ECU and sensor, rather than pointer ohm gauge.

4. PC software environment

As KT720 operates based on the computer, the KT720 software and relevant hardware driver software shall be installed onto the computer first of all.

4.1 Computer parameters

Configuration	Parameter (Recommended)	Parameter (Minimum)
Main frequency	CPU larger than 2GHz	CPU larger than 1.5GHz
Memory	Larger than 4GB	Larger than 2GB
Free space of hard disc	Larger than 2GB	Larger than 1GB
USB interface	USB2.0 full speed or high speed	USB2.0 full speed or high speed
WLAN	Wireless network card (WPA/WPA2+PSK)	Wireless network card (WPA/WPA2+PSK)
Display resolution	Higher than 1280*768, 32-bit above color depth	
OS	WINDOWS XP /WINDOWS 7	WINDOWS XP /WINDOWS 7

4.2 Software installation guidance

Installation Steps:

1. Get the installation file(KT720 _Full_Setup_ V2.5.7.exe) from the CD disc furnished by Bosch Automotive Diagnostics Equipment (Shenzhen) Limited or its official website;
2. Double click the file;
3. Click the “**Next**” button to get the interface displaying the user license protocol, which shall be carefully read; if you accept all protocols, please click the “**Accept (I)**” button;
4. Select the target folder for software installation (disc C is the default file location); you can click the “**Browse**” button to select the target folder, and the program will automatically detect the corresponding used and free spaces of target disc;
5. Click the “**Installation**” button, and the software will be under installation; please wait for the installation completion;
6. Installation for the first time, if KT720 connected to the computer properly, please refer to chapter 4.3 USB drive manual installation guide;
7. After installation, if you select the “Run KT720 ” and click the “**Finish**” button, the installation completion will be confirmed and the KT720 software will be run; if you only click the “**Finish**” button, the installation completion will be confirmed but the KT720 software will not be run;
8. After installation, the shortcut will be displayed on the computer desktop; just click the shortcut to run the KT720 software.

Need to manually install the USB driver software installation is completed, please refer to 4.3 USB drive manual installation guide.

You are adminiatrator when you insatll software;You have access to write installed folders;

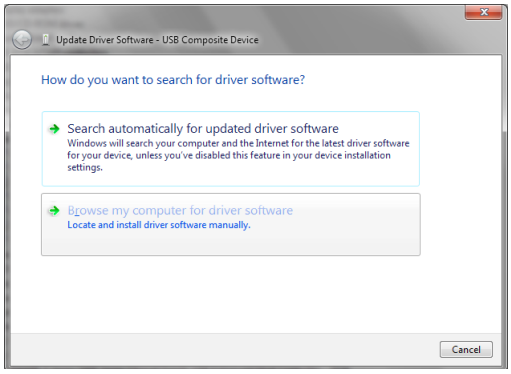
Please install the PDF reader to view more help files conveniently.

4.3 USB driver installation

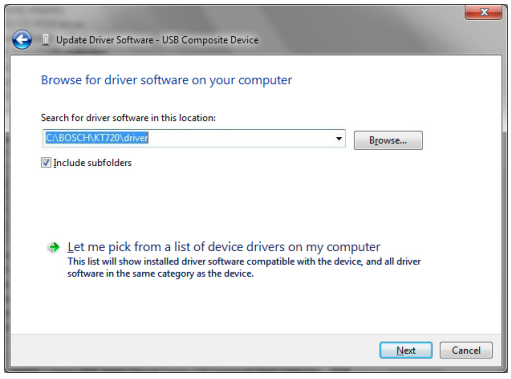
you must to manual install USB driver after KT720 software intallation.

Installation steps:

1. Connected KT720 device and computer by USB cable.
2. Select "Device Manager" in "Control Panel";
3. Select "RNDIS/Ethernet Gadget" in "Other Device";
4. Click right mouse button, select "Update Driver Software ";
5. Select "Browse my computer for driver software";



6. Click "Browse" button, find the driver software in install folder of BOSCH\KT720 \Driver\KT720 _Driver .



7. Click "Next" button, wait for install successfully.

4.4 Software uninstall

After installing the software,KT720 folder will be displayed under the program submenu of the “**Start**” menu.

Directly click “Uninstall” to uninstall the software. Please operate following the interface prompts till the uninstall completion.

5. Packing list

Name	Part.No	Amount
KT720 device	1697021769	1
Quick Start for KT720	1697021770	1
KT720 User Manual	1697021771	1
KT720 carry case	1697021772	1
KT diagnostic software CD	1697021784	1
Power Adapter	1697021651	1
Power calbe:Chinese 3 Pins Power Supply	1697501314	1
USB Communication Cable	1697021648	1
Diagnostic extension cabel	1697021637	1
MITSUBISHI Adapter 12Pin	1697021640	1
Multi-Function Adapter jumper wire	1697021639	1
OBD 16Pin Adapter	1697021636	1
Mazda 17Pin Adapter	1697021638	1
Toyota 17Pin Adapter_Square	1697021644	1
NISSAN 14Pin Adapter	1697021645	1
Honda 3Pin Adapter	1697021646	1
CHERY/GEELY 3PIN ADAPTER	1697021649	1
MIN-CAR 3PIN ADAPER	1697021650	1
Adapter for Hyundai Remote device	1697021643	1
KIA Adapter_Red	1697021641	1
KIA Adapter_Black	1697021642	1
POWER EXTENSION CABLE	1697020105	1
ALLIGATOR CLIP SUPPLY CABLE	1697020106	1
CIGARETTE IGNITER SUPPLY CABLE	1697020107	1
RED CAPACITIVE PICKUP	1697020114	1
GREY CAPACITIVE PICKUP	1697020115	1
RED BANANA SOCKET	1697020117	1
GRAY BANANA SOCKET	1697020118	1
BLACK BANANA SOCKET	1697020119	1
1 CYLINDER SIGNAL CLIP	1697020120	1
BLACK ALLIGATOR CLIP	1697020125	1
RED ALLIGATOR CLIP	1697020124	1
DIFFERENTIAL PROBES	1697021743	1
OSCILLOSCOPE PROBE	1697021745	3
KT700 VMI BATTERY(Optional)	1697020132	1
WIFI MODULE	1697021717	1
MICRO SD CARD	1697021756	1
PORTABLE COMPUTER		1

6. Introduce to KT720 device

6.1 Device identifiers

Identification	Description
	THE POWER LED, LIGHT UP IN GREEN TO THE POWER SUPPLY
	ERROR LED, LIGHT UP IN RED TO THE ERROR OF KT720
	THE COMPUTER COMMUNICATION LED
	Power button
	RECORDER BUTTON

LED: Battery(Optional) level <= 15%, flash 2s/times in yellow, and light off in green. Battery(Optional) level <= 10%, flash 0.5s/times, and buzzer 0.5s/times(2times).

6.2 Connection terminal

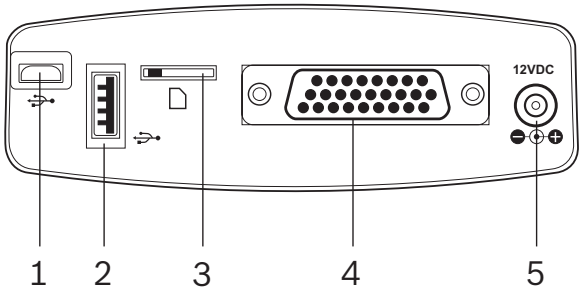


Fig. 2: Connection terminal

No.	Description
1	TROUGH OF MICRO SD CARD, STORED RECORDED DATA AND SYSTEM PACKAGE
2	USB 2.0 INTERFACE, TROUGH OF WIRELESS ADAPTER
3	MICRO USB, USED FOR COMMUNICATION
4	Data record interface
5	POWER INTERFACE

Avoid missing wireless adapter(Optional) and SD card, please don't pull out.

6.3 Oscillograph terminal

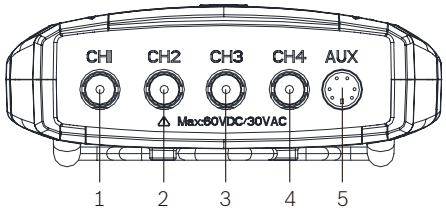


Fig. 3: Oscillograph terminal

No.	Description
1	CH1, OSCILLOGRAPHIC CHANNEL 1
2	CH2, OSCILLOGRAPHIC CHANNEL 2
3	CH3, OSCILLOGRAPHIC CHANNEL 3
4	CH4, OSCILLOGRAPHIC CHANNEL 4, MULTIMETER CHANNEL
5	AUX, Assistant channel

6.4 Assistant function

Hook: KT720 device hung on the front of car cover in measurement process.
Loading capacity: 5KG.

Battery(Optional): 2200mAh battery, the work time of battery is at least 2 hours under USB communication. The work time of battery is at least 1.5 hours under wireless communication.

7. Equipment connection

According to different functions, the connection modes are: including measure connection, selfcheck connection and upgrade connection.

7.1 Measured connection

Before using the equipment, please ensure the normal connection among the KT720 , computer, and measure assembly. The default measure is USB.Connection mode switch, please refer to section 9.3.

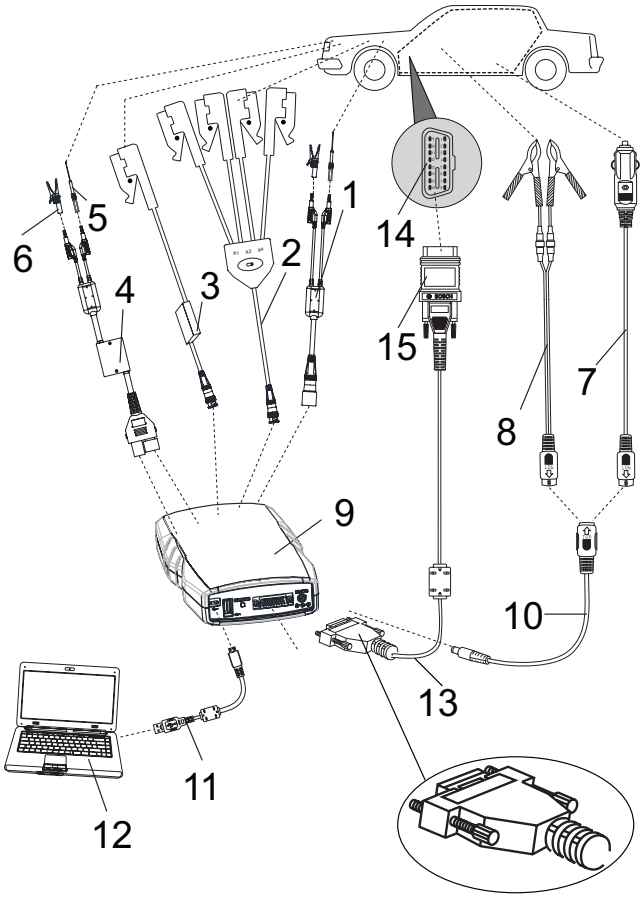


Fig. 4: Measured connection

1 oscilloscope probe
2 Capacitive pickup(Red, Gray)
3 1 cylinder signal
4 differential probes
5 Banana socket(Red, Gray, Black)
6 Crocod clip(Red, Black)
7 Cigarette igniter supply cable
8 Battery terminal power supply line
9 KT720 device
10 Power extension cable
11 USB communication cable
12 Computer
13 Diagnostic extension cable
14 Diagnosis of car
15 Connector

The power supply when measured : Alligator clip supply calbe, Cigarette igniter supply cable, or Battery terminal power supply line, the diagnostic line of power supply (only in the diagnosis of mode) or battery machine (at the oscilloscope function is recommended to use the way of power supply)

The measured cable: Capacitive pickup, 1 cylinder signal,oscilloscope probe or differential probes connected with banana socket and crocod clip.

7.2 Selfcheck / Upgrade connection

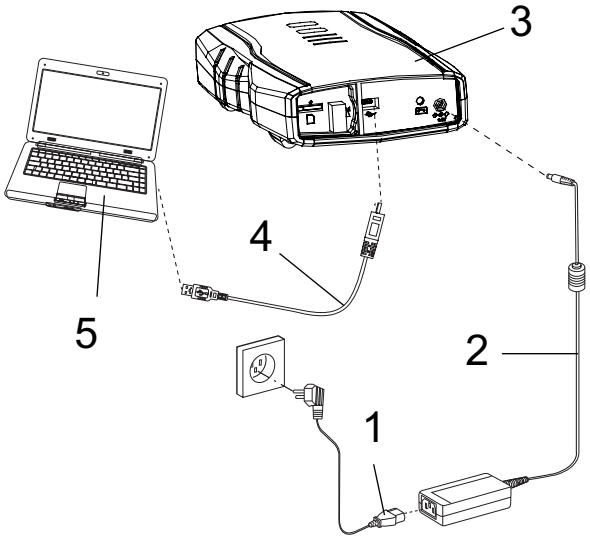


Fig. 5: Selfcheck / Upgrade connection

1 Power cable:chinese 3 pins power supply
2 Power adapter
3 KT720 device
4 USB communication cable
5 Computer

You can connected computer and KT720 through wireless.

8. Original start

The default communication mode of KT720 is USB communication, and if KT720 device and computer are properly connected through USB cable, the software will be automatically configure USB communication mode when you start KT720 software.

You can use KT720 only after it is activated. Please refer to the steps in Section 9.4.1 to activate.

To measure the vehicle with the latest software, firmware and system, please refer to Section 9.2 to upgrade the software, firmware and system.

9. System setting

KT720 settings include system setting, software upgrade, communication setting andKT720 theses four functions.

9.1 System setting

System setting includes language setting, user information, proxy setting and password change.

9.1.1 Language setting

KT720 provides various language systems available for users to switch languages.

Operation steps:

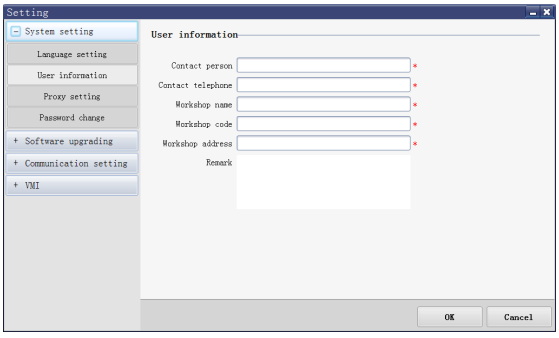
1. Select "system Settings" module under the "language";
2. Enter the language setting module, and select required language in the check box of “please select languages”;
3. Click “OK” button, and the interface will prompt “Activation takes effect when you reboot the system!”
4. Restart KT720 software.

9.1.2 User information

User information includes contact person, contact number, name, code and address of workshop and notes.

Operation steps:

1. Select "system Settings" module under the "user information";
2. Input your information in all input boxes marked with “*”.
3. Click “OK” button to save the user information you input, and click “Cancel” button to cancel the user information you input”.



User information is the same as the information to be input when printing, and no more input is required after the user information is saved.

9.1.3 Password change

This function can be used only after it is activated.

Operation steps:

1. Select "system Settings" module under the "password change";
2. If KT720 is properly connected with the computer, the serial number of the product will be automatically acquired.
3. Input correct user name and original password in proper order.
4. Input new password and confirmed password again, and new password must be exactly consistent with confirmed password, otherwise the password can’t be modified.

9.2 Software upgrading

Software upgrading includes software online upgrade,firmware upgrade.
The function can be used only after the product is activated. If not, the interface will display “Not Activated”.

Please confirm whether your KT720 is properly connected with the computer through USB cable before upgrade,See 9.3.1 connection method.

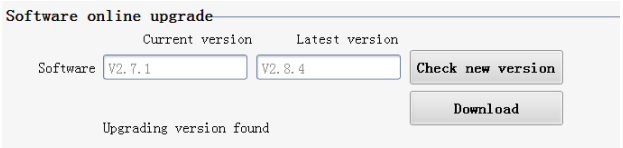
Please ensure the process integrity, and do not forcefully stop the program.

9.2.1 Software online upgrade

KT720 application software is Diagnosis database and system upgraded on line.

Operation steps:

1. Select "software upgrade" module under "software upgrade" online;
2. The software will automatically check the current version of application software installed on your computer.
3. Please click “Check new version” button, and the system will automatically login and check the latest version by saved user name and password, and display in “Latest version” column; if the user name and password are incorrect, the system will enter the user login interface, please recheck the latest version after inputting user name and password.
4. If a latest version is detected, the interface will display “Download” button.



5. Please click “Download” button, wait, and monitor the download progress by downloading progress bar.

6. Please click “Install” button after download, and install the upgrade package following the on screen prompts.
7. The application software of the latest version can be used only after restarting software.
8. If the user name and password are incorrect, you will be prompted, that the incorrect input shall not exceed 3 times. If so, you can re-input after 15 minutes.

9.2.2 Firmware upgrade

KT720 after the software upgrade, the system will automatically detect the firmware version, if you have a new firmware version, interface will automatically pop up the firmware update interface, prompted to upgrade the new solid pieces.

Operation steps:
1. KT720 connected to the computer with USB cable,connection methods see 9.3.1;
2. System automatically detects the current version of the software on your computer and automatically upgrade.

9.3 Communication setting

KT720 communication settings include: USB, wireless and wireless router communication.

9.3.1 USB Communication Setting

The default communication mode of KT720 is USB communication.

After other communication modes are successfully applied, switch to USB communication mode, please set up following the below methods.

Operation steps:
1. Connect the KT720 to the computer with USB cable The interface will pop out a prompt dialog box.
2. Click “Yes” button and wait till the automatic connection is successful.

9.3.2 Wireless communication settings

Operation steps:
1. Enter “Communication Setting” model after USB module is communicated successfully;
2. select “Wireless Mode” from “Connection Type” till the automatic connection is successful;
3. Disconnect the USB cable after successful connection.

IP address in the wireless connection property of the computer must be automatically acquired.

9.3.3 Wireless router communication settings

Operation steps:
1. Enter “Communication Setting” after USB model is communicated successfully, and click “Wireless Network Connection” button to view all available wireless router networks.
2. Select wireless network, and double click its name to connect.

If the wireless router network is protected by password, you must input correct password to connect after double clicking the name.

3. Select “Wireless Router Mode” from “Connect type” after successful wireless connection till the automatic connection is successful.
4. Disconnect the USB cable after successful connection.

Please set the Security Mode of wireless router as WPA- Personal or WPA2-Personal.

If there is a router isolation (AP Isolation or Wireless Isolation) function option, please disable the function.

It is suggested to close the firewall of router.

9.4 device

KT720 device includes product activation, product information,device information,device self-check and battery information.

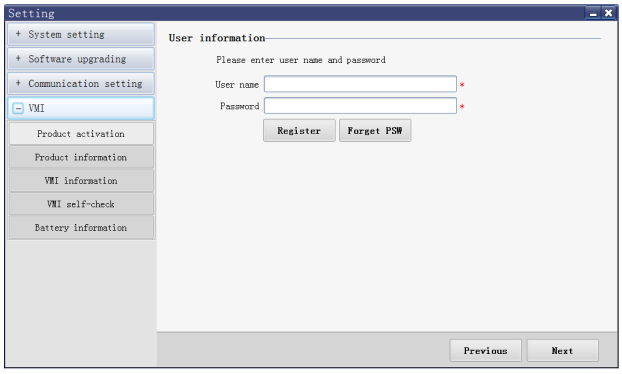
9.4.1 Product activation

If the device is not activated, it can not be used to measure the vehicle.

The device can only be activated at USB communication mode.

Operation steps:

1. Check whether KT720 is properly connected with the computer, if so, KT720 software will automatically check the serial number of the product.
2. Click “Activate” button, and the system will automatically check the network. If the network is not properly connected, the interface will display “Network Connection Timeout!”.
3. If the network is properly connected, the interface as shown below will appear.



4. Register directly, and click “Register” button to enter the user information interface, and input your information following the on screen prompts; if the information is incorrect, you will be prompted to refill.
5. If all information you input are correct, click “Next” button. Once activated successfully, the interface will prompt “The product has been successfully activated! Please restart the software!”.
6. KT720 software can be normally used after.

User name is composed of Chinese characters, English letters and figures with length of 3-16 characters and password length of 6-16 characters, and a Chinese character takes up two characters; no spaces allowed.

User name is used to login, and can’t be duplicate, and it is suggested to register with real name. The email is used to find password back, please fill your frequently used email correctly, and remember your user name and password when submitting the user information.

9.4.2 Product information

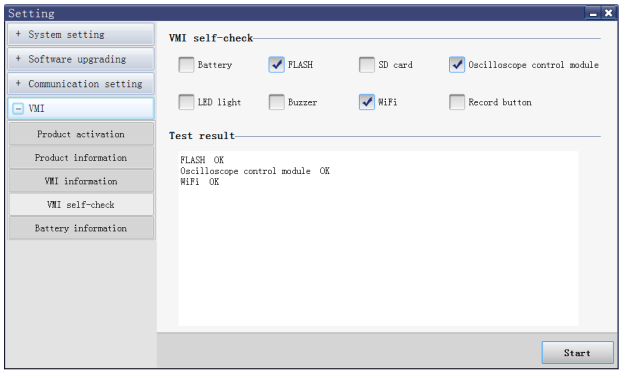
Product information includes product’s serial number, equipment type, model, software version and activation status. The system will automatically check the product information after KT720 is properly connected with the computer.

9.4.3 Device information

KT720 information includes serial number, hardware version information, firmware version information and system version information. The system will automatically check KT720 information after KT720 is properly connected with the computer.

9.4.4 Device Self-check

This function is to check whether relevant hardware of KT720 is normal, including battery, FLASH, SD card, oscilloscope control module, LED light, buzzer, wireless network card and record button.



Operation steps:

1. Ensure that KT720 is successfully communicated with the computer.
2. Select the items which you want to check.
3. Click “Start” button, and check results will be displayed.

KT720 must be disconnected with the measuring line during the self-check.

9.4.5 Battery information

Display battery-related information, including battery status, battery level, voltage and temperature.

The battery status is divided into charging and discharging, and battery level is displayed as a percentage.

Battery voltage continuously varies with the increase or decrease of battery power level.

Battery temperature continuously rises with the KT720 running or charging of the battery.

If KT720 has been installed battery, the battery status in the status bar of software interface will be displayed. If not, it will be displayed.

10. vehicle diagnosis

Main display:

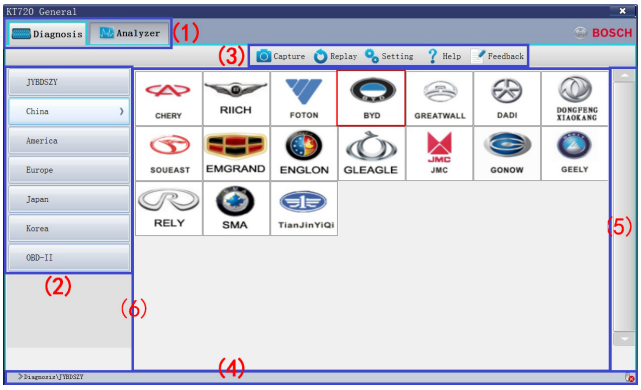


Fig. 6: Main display

No.	Description
(1)	The main function area, including Diagnosis, Analyzer
(2)	The display area for measure function, including General OSC, Recorder, Sensor, Actuator, Ignition system, Electrical system, communication system and multimeter.
(3)	The system function area, including capture, replay, setting, help and feedback
(4)	The status column, including measure path, communication modes status and connect status. The battery status will be displayed after installed batteyr.
(5)	The scroll bar, when display more than one screen at a time, you can drag the scroll bar to view the contents of the screen.
(6)	Measurable brand display area, each brand can test all of the brand;

10.1 test condition

- Open the auto ignition switch;
- For the 12 v or 24 v car battery voltage grade;
- KT720 host connection has been established with computer communication.

10.2 Power supply

There are 4 power supply modes for KT720 device, you can select according to your requirement:

- AC power supply: take out power adapter and power cable:chinese 3 pins power supply in the instrument; connect one end to the power interface of the instrument and another end to 100~240V AC socket;
- Automobile battery cell power supply: take out KT720 power extension cable and alligator clip supply cable, and connected; connect one end to the power interface of the instrument and another end to battery end of vehicle;
- Cigarette lighter power supply: take out KT720 power extension cable and cigarette igniter supply cable, and connected; connect one end to power interface and another end to cigarette ighter of vehicle;
- KT720 battery(Optional).

10.3 Manual Selection

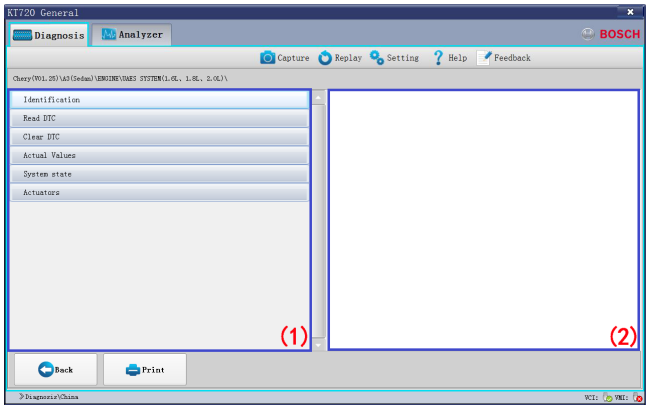
You may manually select the corresponding vehicle model, system or system function to proceed to the diagnosis operation.

For example, you may: click “Chinese Vehicle Series” --- “Chery” --- “Fulwin” ---”Engine” --- “Motorola EFI System”, and then carry out the diagnosis test on your desired system function.

10.4 Diagnostic

10.4.1 Introduction to Main Interface of Diagnosis System

After you access the diagnosis system, the VCI software interface will display all diagnosis functions that can be achieved by this system.



No.	Description
①	The display area for diagnosis functions: it shows all diagnosis functions of this system;
②	The display area for help information: it shows the help information of a diagnosis function and supports both literal and graphic information.

: Click this button to go back to the main interface. You can find this button on display of select menu, read DTC and read data stream.

: Diagnostic help button, if there have help information, the button will display. Otherwise not display. Adjust cycle of waveform, the high frequency will be show one screen waveform everytime, the low frquency will be show waveform by point scanning.

Diagnostic help file formats: images (JPG, BMP, PNG, SVG); HTML The format of the web page file and TXT file.

10.4.2 Reading Version Information

This function is used to read the computer information of the system being tested. The information read varies with different vehicle models or systems. Generally, when you replace the vehicle control unit, it is necessary to read and record the information of original control unit and take such information as a reference for purchasing a new control unit. Coding a new control unit requires the information of original control unit.

Operation Steps:

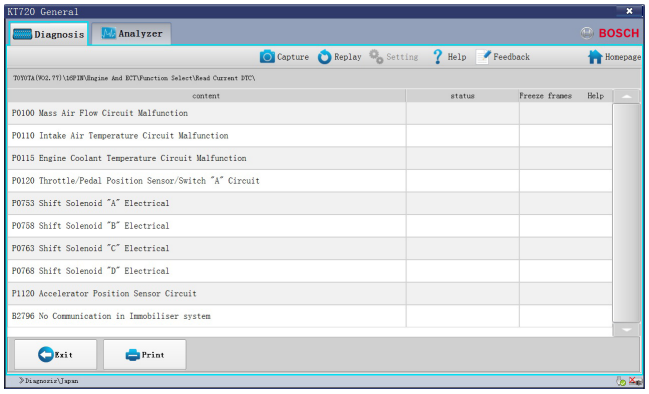
1. After proceeding to the diagnosis function, click “Read Version Information” to get a pop-up dialogue box, which shows the relevant information of vehicle computer such as software version, hardware version and part numbers.
2. Click the “OK” button to quit this function.

10.4.3 Reading DTC

This function is used to read the fault code in the ECU memory of the system being tested, helping the service personnel quickly find out the cause of vehicle fault.

Operation Steps:

1. After proceeding to the diagnosis function, click “Read Fault Code”.
2. Open the fault code interface to view the fault code items, including content, status (current or random), freeze frame and help.



3. Click the “Exit” button to quit this function.

If the system being tested is normal, the interface will display “System OK” and the button “Clear Fault Code” will not appear on the interface.

If the fault code has some freeze frame or help information, its icon is blue. Or else, its icon is gray, which means unavailable.

Button Description:

Button	Description
	Reading the freeze frame information; when it is displayed in grey, this means there is no freeze frame information;
	The help information for fault code; when it is displayed in gray, this means there is no help information;
	Clearing the fault code, see 9.3.4; if the system being tested is normal, this button will not appear on the current interface;
	Refreshing the current fault code; after eliminating some faults, you may click this button to refresh the existing fault codes.

10.4.3.1 Help Information for DTC

It is used to display the help information for the opposite fault code.

Operation Steps:

➢ Select a fault code, and click the “Help Information for Fault Code” button. Then the interface will show the help information for this fault code, helping the service personnel quickly find out and solve the problem.

This interface is an independent window, regardless of the diagnosis software.

10.4.3.2 Reading Freeze Frame

In the engine management system, the freeze frame function is supplementary to the fault code function. It is basically used to freeze the relevant working conditions of engine when engine fault arises, helping the service personnel know the working conditions of the whole vehicle upon the fault occurrence.

Operation Steps:

1. Select a fault code, and click “Read Freeze Frame Information” to proceed to the corresponding interface. Each freeze frame can display a maximum of 5 groups of data;
2. Click the “Exit” button to quit this function.

You may also proceed to this function through the “Read Freeze Frame” button at the diagnosis function area, but then only the freeze frames for common data streams can be read and generally only one group of data will be displayed.

10.4.4 Clearing DTC

It is used to clear the DTC saved in the ECU memory of the system being tested.

Operation Steps:

1. After proceeding to the diagnosis function, click “Clear Fault Code” to get the dialogue box, which displays the clearing conditions.
2. After the completion of fault code clearing, the interface will display “Clearing Command Executed”;
3. Click the “OK” button to quit this function.

For the common vehicle models, you shall strictly comply with the following regular work procedures: firstly, read, record (or print) and clear the fault codes; then, test the vehicle, and re-read the fault codes for verification; next, service the vehicle and clear the fault codes; finally, re-test the vehicle and confirm that the fault codes are no longer present;

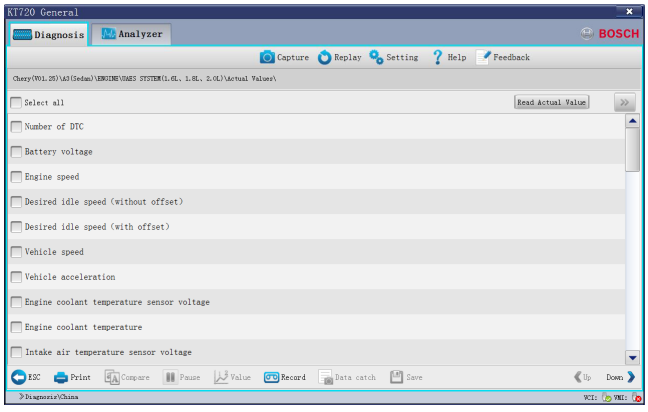
It is impossible to immediately clear any current hard fault code. Although such technical fault codes involving oxygen sensor, knock sensor, mixture correction and cylinder misfire can be immediately cleared, they would reappear within a certain period. Only after the fault has been completely eliminated will a fault code never reappear.

10.4.5 Reading Data Stream

By means of values or conditions of data streams, this function can identify whether the vehicle components are faulty.

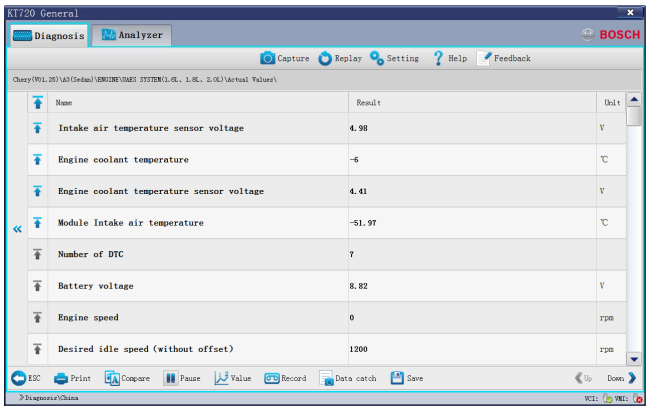
Operation Steps:

1. After proceeding to the diagnosis function, click “Read Data Stream” to get the “Read Data Stream” dialogue box;
2. Click the “Select All” check box to select all data streams; also, you may only click the check boxes in front of data streams to select the desired data streams;



You can click "» " button to switch to the interface that display data flow result.

3. Click “Read Data Stream” to view names, results and units of data streams;



4. Click the “Exit” button to quit this function.

You can click "« " button to switch to the data flow select interface.

When you are reading the data streams, the “Pause” button can be clicked to provide convenience for you to view the results of data streams. Once clicked, the “Pause” button will switch to the “Resume” button.

Button Description:

Button	Description
	The “Top” button; to set a data stream to the top for display, click this button in front of this data stream; to cancel the setting, click this button again;
	The “Exit” button, used to quit the function “Read Data Stream”;
	The “Print” button, see <9.5.1>;
	The “Compare Data Streams” button, see <9.4.5.2>;
	The “Pause/Resume” button; when clicked during the course of reading data streams, it pauses the reading and switches to the “Resume” button; to resume the reading, click the “Resume” button;
	The display mode of data stream, see <9.4.3.5>;
	The “Travel Recorder” function, see <9.4.6>;
	The “Capture Data Streams” function, see <9.4.5.1>;
	The “Save Data Streams” function, see <9.4.5.3>;
	Viewing the previous page of data stream;
	Viewing the next page of data stream;

10.4.5.1 Capturing Data

It records the data stream being tested.

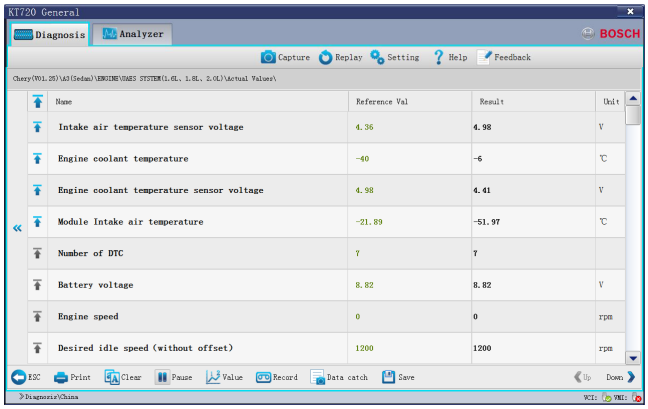
Operation Steps:

1. Click the “Capture Data” button and start to record the current value of data stream; you may turn the pages to record all data streams. If you do not turn the pages, only the data stream displayed in the current screen will be recorded;
2. Click the “Save” button to save the data stream read.

Before you activate the “Capture Data” function, the “Save” button is gray, which means unavailable.

10.4.5.2 Comparing Data Streams

By means of comparing the current values of data streams with the saved history values of data streams, this function can identify whether the relevant components present a good working condition.



Operation Steps:

1. Click the “Compare” button to get the dialogue box which displays all openable data stream files.
2. Select a data stream file and click the “Open” button to get the interface which displays the current read values and recorded history values.

The data stream save path is assigned by the system and cannot be modified; the current values are displayed in black, while the recorded history values are in green;

In the opened dialogue box, you may delete the unnecessary data files which are previously saved;

The “Save” button will switch to the “Clear” button.

10.4.5.3 Saving Data

This function is used to save the values of all currently captured data streams.

Operation Steps:

1. Click the “Save” button to get the “Save” dialogue box, in which the save path is assigned by the system and cannot be modified;
2. Enter the file name and click “Save”; then, the interface will display “Data Saved”.
3. Click "OK" to complete the saving of data streams; then, the “Save” button will go gray, which means unavailable.

10.4.5.4 Clearing Data

This function is used to clear the comparison between data streams.

Operation Steps:

➢ Click the “Clear” button to clear the history values of data comparison; meanwhile, the “Clear” button switches to the “Compare” button.

10.4.5.5 Display Modes of Data Streams

The value of a data stream can be displayed in three modes, i.e. numeral, waveform and control. The numeral display mode is taken as a default.

Operation Steps:

1. After reading the data streams, the values of read data streams will be displayed in numerals;
2. Click the “Numeral” button and select "Waveform" from the pop-up options; then the values of data streams will be displayed in waveforms, and the “Numeral” button will switch to the “Waveform” button;
3. Click the “Waveform” button and select "Control" from the pop-up options; then the values of data streams will be displayed in controls and the “Waveform” button will switch to the “Control” button;
4. Click the “Control” button and select "Numeral" from the pop-up options; then the values of data streams will be displayed in numerals and the “Control” button will switch to the “Numeral” button.

The button status switches in compliance with the mode in which the current data streams are displayed.

10.4.6 Playing Back Data Stream

Playing back the saved data streams is helpful for timely finding out faults.

Button Description:

- **Exit**: quit the travel record playback;
- **Load**: load the data stream record to be played back;
- **Export**: after loading the data stream playback, the system can export the data stream playback and save it in the “CSV” format to the assigned path;

Operation Steps:
1. After saving the data stream record, the “Load” button automatically becomes available. Now, click “Load”, and select the data file you want to play back;
2. Click the (“Play”) button.Now, the “Play” button switches to the (“Pa) button;
3. You may also click the (“Stop”) button to stop the data stream playback and carefully observe whether the data stream is normal;
4. If you want to export the data stream playback, you just need to select a folder directory and click the button “Save”. The file will be saved in the “.CSV” format to the path as assigned.
5. Click "Exit" to quit the “Play Back Data Streams” function.

You may also proceed to the “Play Back Data Streams” function through the (“Playback”) button at the main interface of software;

The software interface provides a time progress bar, through which you can view the duration of current playback.

10.4.7 Action Test

This function is used to test whether the executive elements and components of electronic control system can work normally.

Operation Steps:
1. After proceeding to the diagnosis function, select “Action Test”. Now, the interface will display all available action tests.
2. Click a test item to proceed to the action test interface. There are three modes for the action test, i.e. Enable, Disable and Exit;
3. Click “Enable” to activate the action test;
4. Click “Disable” to deactivate the action test;
5. Click “Exit” to quit the action test.

10.4.8 Advanced Functions

The advanced functions (such as Write IQA Codes and Reset Maintenance Lamps) are functions other than the basic ones and can modify the internal information of ECU.

Operation Steps:
➢ Proceed to an advanced function, and operate as per the interface prompts till the completion.

10.5 Other Functions Related to Diagnostic

10.5.1 Print

The “Print” function provides three options, i.e. “Print Current Screen”, “Print Detection Record” and “Print Diagnosis Report”.

Print Modes:
- Print: if the computer has been connected with a printer, direct print is available; or else, you can only preview the information to be printed.
- Print to File: see 10.5.1.4.

10.5.1.1 Print Current Screen

It is used to print the content displayed in the current screen.

Operation Steps:
1. Select “Print” --- “Print Current Screen”;
2. Just select a print mode (either “Print” or “Print to File”) to start printing.

When you select “Print Current Screen”, it is unnecessary to enter any information, and all information displayed in the current screen will be directly printed.

10.5.1.2 Print Detection Record

It is used to print the current detection information.

Operation Steps:
1. Select “Print” --- “Print Detection Record”; only after detection functions (such as “Read Fault Codes”, “Read Data Streams” and “Read Version Information”) have been enabled can this button be available; or else, this button will be gray, which means unavailable;
2. Fill in the corresponding blanks with the information relevant to detection record; any blank marked with “*”must be filled in, otherwise it is impossible to print the detection record;

If all the user information has been completed, need to fill out the car owners and car VIN code.

3. Just select a print mode (either “Print” or “Print to File”) to start printing.

10.5.1.3 Print Diagnostic Report

It is used to print the diagnostic report.

Operation Steps:
1. Select “Print” --- “Print Diagnosis”; only after any of the functions (i.e. “Fault Codes”, “Data Streams” and “Version Information”) has been enabled can this button be available; or else, this button will be gray, which means unavailable;

2. Select the diagnosis report(s) to be printed; it is available to simultaneously print the diagnosis reports on Version Information, Fault Codes and Data Streams, provided that such three functions have been enabled; if merely the “Read Version Information” function has been enabled, then the Fault Codes and the Data Streams will be gray and cannot be printed;
3. Fill in the corresponding blanks with the information relevant to diagnosis report; any blank marked with “*”must be filled in, otherwise it is impossible to print the diagnosis report;

If all the user information has been completed, need to fill out the car owners and car VIN code.

4. Just select a print mode (either “Print” or “Print to File”) to start printing.

10.5.1.4 Print to File

5. It is used to print the desired content into an image file in the “JPG” format.

Operation Steps:
1. Select “Print to File” to get a pop-up dialogue box for saving;
2. Select the save path for the file;
3. Enter the file name;
4. Finally, click the “Save” button.

10.5.2 Image Browse

It provides convenience for you to browse images.

Operation Steps:
➢ Double click the image to proceed to the “Image Browse” function.

Toolbar Description:

Identification	Description
	The “Zoom In” button, used to zoom in the browsed image;
	The “Zoom out” button, used to zoom out the browsed image;
	The “Restore” button, used to restore the browsed image to its original size;
	The “Clockwise Rotate” button, used to rotate the browsed image clockwise;
	The “Counterclockwise rotate” button, used to rotate the browsed image counterclockwise;
	The “Print” button, used to directly print the image into a file, provided that the computer has connected with a printer;
	The “Close” button, used to close the image browse tool.

11. Measure function

Main display:

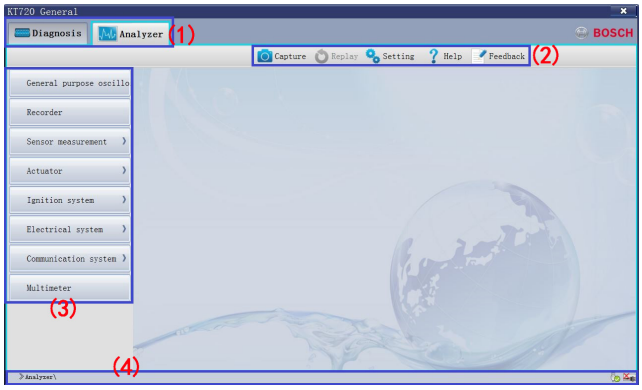


Fig. 7: Main display

No.	Description
(1)	The main function area, including Diagnosis, Analyzer
(2)	The system function area, including capture, replay, setting, help and feedback
(3)	The display area for measure function, including General OSC, Recorder, Sensor, Actuator, Ignition system, Electrical system, communication system and multimeter.
(4)	The status column, including measure path, communication modes status and connect status. The battery status will be displayed after installed batteyr.

11.1 Power supply

There are 4 power supply modes for KT720 device, you can select according to your requirement:

- AC power supply: take out power adapter and power cable:chinese 3 pins power supply in the instrument; connect one end to the power interface of the instrument and another end to 100~240V AC socket;
- Automobile battery cell power supply: take out KT720 power extension cable and alligator clip supply cable, and connected; connect one end to the power interface of the instrument and another end to battery end of vehicle;
- Cigarette lighter power supply: take out KT720 power extension cable and cigarette igniter supply cable, and connected; connect one end to power interface and another end to cigarette ighter of vehicle;
- KT720 battery.(Optional)

11.2 Function button introduce

Button	Description
Exit	Exit measured process
Print	Measured information should be printed to picture or printed
Load	Load snapshot data or reference waveform from appointed folder
Setting_S_L	Current parameter setting could be saving, and saved parameter can be download
Auto-Set	Automatically adjust the amplitude, the waveform position, the trigger level, so that the amplitude at the best
Snapshot	Capture current waveform and save
Parameter	Slect frequency, duty cycle, peak-to-peak, pulse width, maximum, minimum, and average of current waveform
Record-Set	Only for Record, setting trigger type and recorded length
Comparison	Waveform comparison, reference wave form and real-time waveform can be compared at same time. Reference waveform display with dotted line
IGN Setting	Only for Ignition, setting ignition mode, sensation,number of cylinder and ignition order
3D display	Only for Ignition, display mode, include 3D display, vertical, side-by-side, single. Default is 3D display
A/D Analog	Only for communication system, filter function, signal change between simulation model and digtal model, default is simulation model
DC Voltage	Only for multimeter, measure DC voltage in CH1 to CH4 channels
AC voltage	Only for multimeter, measure AC voltage in CH4 channel
On-off	Only for multimeter, measure lead switching in CH4 channel
Resistance	Only for multimeter, measure resistance in CH4 channel
Diode	Only for multimeter, measure diode in CH4 channel
	Pause/Start button. Click pause button, display didn't fresh, pasue change to start, click start button, continue collect.
	Record button, record displayed waveform. Click this button, start record; click again, stop record. The function same as record button on main unit and record extension cable.

The function of Record button in Record interface can't be achieve by record key-press on device or record extension cable(Optional).

11.3 Parameters adjust

11.3.1 Cycle

Adjust cycle of waveform, the high frequency will be show one screen waveform everytime, the low frquency will be show waveform by point scanning.

The time base. Use the sec/div control to set the amount of time per division represented horizontally across the screen.

High frequency: 1us/div~50ms/div
Low frequency: 100ms/div~50s/div

11.3.2 Channels, amplitude and coupling

Channel: Open channel and display waveform. CH1, CH2, CH3 and CH4 will display waveform at the same time. Red is CH1, bule is CH2, green is CH3, brown is CH4.

Amplitude: The attenuation or amplification of the signal. Use the volts/div control to adjust the amplitude of the signal to the desired measurement range.

Coupling: include AC, DC, and GND. The default is DC.

11.3.3 Trigger function

Trigger function will be enabled only when the frequency is less than 100ms/div can be selected by the user a particular waveform events need to be concerned. The user can be isolated from the waveform amplitude of the need to care about a particular waveform, glitches, setup and hold times and stable waveform display through different trigger mode. Use repetitive waveform can be shown in the waveform drawing area.

Trigger function can only be used at high frequencies.

11.3.3.1 Trigger position

Trigger position determines the length of viewable signal both preceding and following a grigger point. Varying the trigger position allows you to capture what a signal did before a trigger event.

➢ You can set the trigger position through directly drag the slider at the top of waveform drawing area.

11.3.3.2 Trigger channel

Use the trigger level to stabilize a repeating signal, or to trigger on a single event. Trigger channel only be selected by opened channels, and only used when the frequency is less than 100ms/div.

There can be only one channel as the trigger channel.

Trigger channel and trigger type should be binding.

The waveform will be bold display of trigger channel.

11.3.3.3 Trigger level

The trigger level provide the basic trigger point definition, when inputed amplitude more than trigger level, VMI will trigger.

➢ You can set the grigger level through directly drag the arrowhead on the right of waveform drawing area.

11.3.3,4Trigger mode

There have 4 trigger mode, as follow:

Level trigger: KT720 will be user-set trigger level position as a basic trigger point, when the rising edge amplitude of the input waveform greater than the trigger level, KT720 will trigger waveform.

Rising edge of the trigger: KT720 will trigger on the rising edge of the input waveform.

Falling edge of the trigger: KT720 will trigger on the falling edge of the input waveform.

Automatic level trigger: KT720 will automatically calculate the trigger position, and trigger at position of the rising edge greater than trigger level, and simultaneously update trigger level position of KT720 software.

11.3.4 Reversed-phase

Select the channel, the waveform will reverse display based on waveform position. Default is off, check was opened.

11.3.5 Adjust cursor

The cursor is to be measure the voltage amplitude and period. Cursor measurement parameters to the current channel as a reference.

Click the cursor with time and voltage, according to the time(abscissa) move, according to the voltage(vertical axis) move, and display the measurements between cursors.

11.3.6 Waveform position

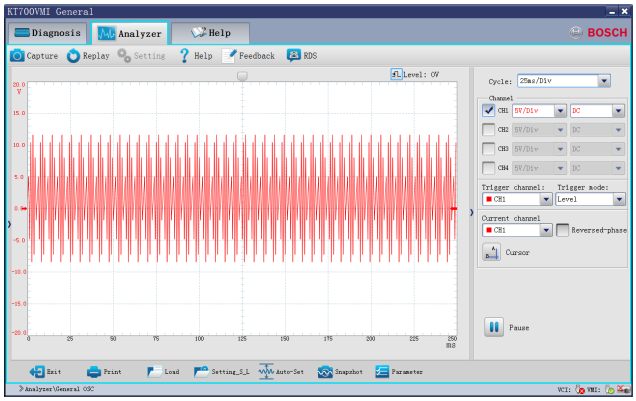
The position of waveform display. Directly drag the small arrow on the left of drawing area to change the waveform display position.

11.3.7 Current clamp

Only for Current Waveform, and only through CH3 and CH4 to measured. 3 kinds of range: 1mV/A, 10mV/A, 100mV/A.

11.4 General oscilloscope

While measuring waveforms of signals from electrical appliances of the vehicle, items listed below shall be followed.



11.4.1 Equipment connection

Connect KT720 and extension line of power supply, choose power supply mode according to battery location of the vehicle to be tested. Connect BNC end of measuring line to oscillographic port on host of KT720 ; then, connect alligator clip to the bonding or battery negative pole, and connect the other end to signal line.

11.4.2 Measuring conditions

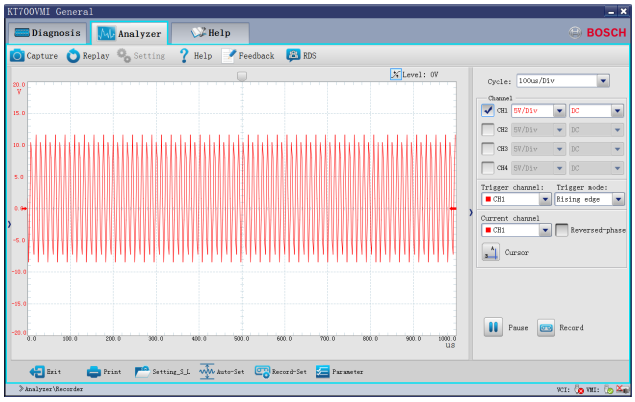
Set up the measuring conditions according to components of the vehicle to be tested.

11.4.3 Measuring steps

1. Properly connect the equipment; switch on power supply of KT720 .
2. Double click to run KT720 software.
3. Select communication mode: USB communication or wireless communication, the KT720 and the computer are successfully communicated.
4. Select Analyzer --> General OSC.
5. Waveform will be displayed on the screen depending on measuring conditions.
6. Please adjust to correct cycle and amplitude to view correct form of the wave. You may adjust the amplitude to the optimized range by clicking “Automatic Set-up”.
7. You can adjust coupling, reversed-phase and cursor; if the cycle locates at high-frequency section, the triggering channel and triggering modes can be adjusted.
8. You can print measured data, load snapshot data and reference waveform data, save current configuration or acquire old configuration, capture the current waveform data and setting of parameters.
9. You can check the details of current waveform by clicking “Pause” button. After click, the button turns to “Start”, click it again to carry forward measurement.
10. You can record a continuous waveform section by clicking “Record” button.

11.5 Recorder

After triggering mode and record length of the current channel are set up through Record Setting button, a continuous waveform section can be captured, the max-length of waveform recorded is 64KBytes/CH. Save the waveform for playback and viewing.



11.5.1 Equipment connection

Connect KT720 and extension line of power supply, choose power supply mode according to battery location of the vehicle to be tested. Connect BNC end of measuring line to oscillographic port on host ofKT720 ; then, connect alligator clip to the bonding or battery negative pole, and connect the other end to signal line.

11.5.2 Measuring conditions

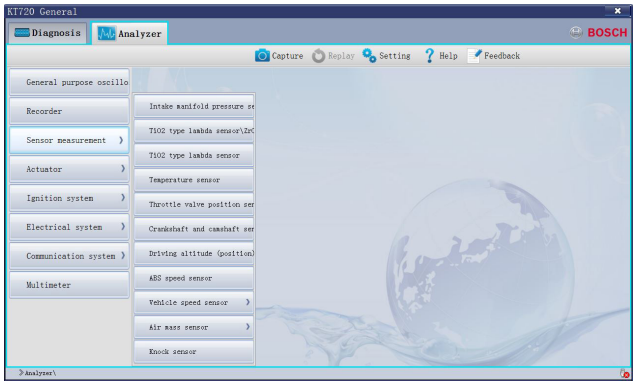
Measuring conditions must be set up according to components of the vehicle to be tested.

11.5.3 Measuring steps

1. Properly connect the equipment; switch on power supply ofKT720 .
2. Double click to run KT720 software.
3. Select communication mode: USB communication or wireless communication, the KT720 and the computer are successfully communicated.
4. Select Analyzer --> Recorder.
5. Waveform will be displayed on the screen depending on measuring conditions.
6. You can adjust to cycle, amplitude, coupling, reversed-phase, and cursor.
7. You can print measured data, load snapshot data and reference waveform data, save current configuration or acquire old configuration, automatically adjust the amplitude, record settings and setting of parameters.
8. You can check the details of current waveform by clicking “Pause” button. After click, the button turns to “Start”, click it again to carry forward measurement.
9. You can record a continuous waveform section by clicking “Record” button.

11.6 Sensor measure

Measured the waveform of sensor.



11.6.1 Manifold absolute pressure sensor (MAP)

Manifold absolute pressure sensor provides engine control unit (ECU) with engine load signal, which generally is frequency-modulated square wave signal or voltage level signal (depending on manufacturer) and is used to change mixing ratio of fuel and other output value after being processed by ECU.

When engine load increases, manifold pressure increases, or manifold pressure is low. Damaged MAP sensor may affect air-fuel ratio when engine accelerates or decelerates, and may affect ignition timing and other computer output values.

11.6.1.1 Equipment connection

When connecting KT720 to power extension cable for power supply, choose power supply according to the battery position of vehicle mode tested. All connecting diagrams in this users manual take power supply by battery clip power cable as example. Connect BNC end ofKT720 oscilloscope probe to CH1, then connect the other end of the black banana plug and black alligator clip to negative pole of battery or grounding, and connect the other end of red banana plug and red banana socket into the trigger signal line of manifold absolute pressure sensor(MAP).

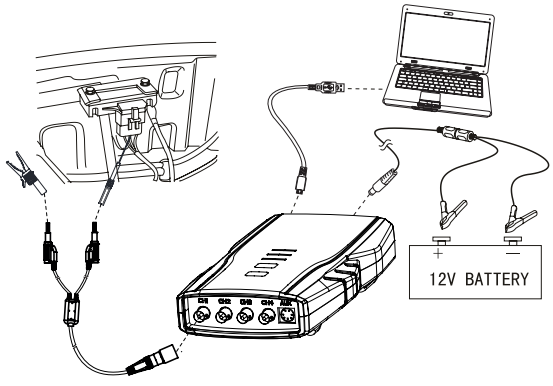


Fig. 8: Equipment connection

11.6.1.2 Measure conditions

- Switch on automobile ignition switch, do not start engine. Use manual vacuum pump to simulate vacuum and connect it to vacuum input port of manifold absolute pressure sensor.
- Monitor signal from idle to acceleration with engine running.

11.6.1.3 Measure steps

1. Connect equipment according to Fig 8, switch on power supply.
2. Double click run KT720 software.
3. Select communication mode: USB communication or wireless communication, the KT720 and the computer are successfully communicated.
4. Click **Analyzer** --> **Sensor** --> **MAP Sensor**;
5. Waveform will be displayed on the screen depending on measure conditions.
6. You can adjust to cycle, amplitude, coupling, reversed-phase, and cursor. If the cycle locates at high-frequency section, the triggering channel and triggering modes can be adjusted.
7. You can print measured data, load snapshot data and reference waveform data, save current configuration or acquire old configuration, automatically adjust the amplitude, snapshot current waveform and waveform comparison;
8. You can check the details of current waveform by clicking “Pause” button. After click, the button turns to “Start”, click it again to carry forward measurement.
9. You can record a continuous waveform section by clicking “Record” button.

11.6.1.4 Waveform analysis

Generally, analog quantity output is common except that the output of manifold absolute pressure sensor in FORD is digital signal. Manifold pressure sensor of analog quantity produces a voltage to ground signal of about 0V in high degree of vacuum, and produces a high voltage to ground signal in low degree of vacuum (approaching atmospheric pressure). Refer to repair manual since different manufacturers may have different indexes.

Digital MAP sensors are mounted on many FORD and LINCOLN vehicles. Output waveform in digital quantity should be pulse with amplitude value of 5V, at the same time, shape is correct, waveform is steady, square angle of rectangle is correct and rising edge is vertical. Frequency and its corresponding degree of vacuum shall comply with the values given in repair materials.

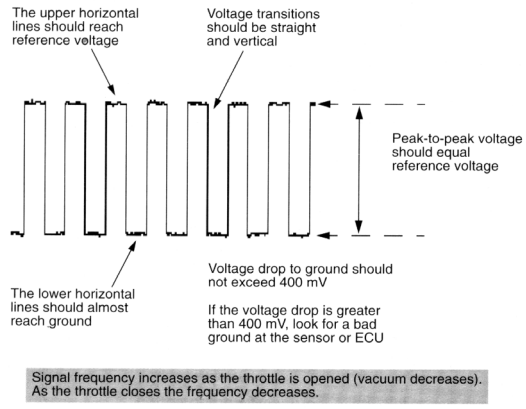


Fig. 9: Manifold absolute pressure sensor (MAP) digital

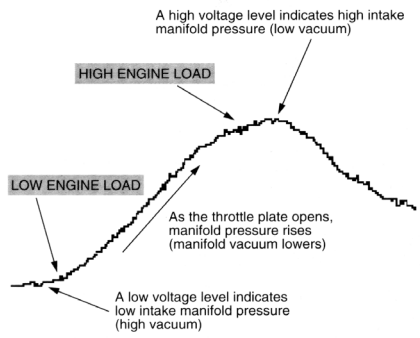


Fig. 10: Manifold absolute pressure sensor (MAP) analog

11.6.2 Oxygen sensor-zirconium and titanium type

Oxygen sensor provides an output voltage which indicates oxygen content in exhaust gas, and this voltage, after being processed by ECU, can adjust fuel supply of engine to change air-fuel ratio. Zirconium dioxide type sensor, like a battery, can provide high output voltage (caused by rich mixing gas) and low output voltage (caused by lean mixing gas); Zirconium dioxide type sensor can change resistance when oxygen content in exhaust gas changes, which, as a result, causes low output voltage (caused by rich mixing gas) and high output voltage (caused by lean mixing gas).

11.6.2.1 Equipment connection

When connecting KT720 to power extension cable for power supply, choose power supply according to the battery position of vehicle mode tested. All connecting diagrams in this users manual take power supply by battery clip power cable as example. Connect BNC end ofKT720 oscilloscope probe to CH1, then connect the other end of the black banana plug and black alligator clip to negative pole of battery or grounding, and connect the other end of red banana plug and red banana socket into the trigger signal line.

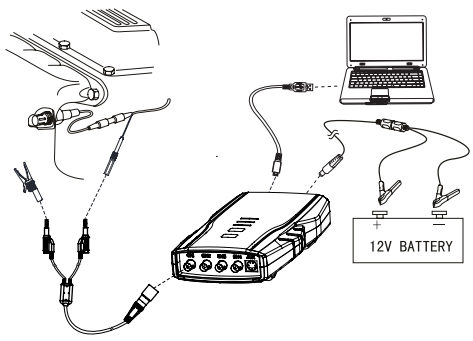


Fig. 11: Equipment connection

11.6.2.2 Measure conditions

- Start engine to heat oxygen sensor to over 315˚C, with engine in closed-loop state.
- Increase engine speed from idle.

11.6.2.3 Measure steps

1. Connect equipment according to Fig.11, switch on power supply.
2. Start engine to heat oxygen sensor to over 315˚C, with engine in closed-loop state.
3. Double click run KT720 software.
4. Select communication mode: USB communication or wireless communication, the KT720 and the computer are successfully communicated.
5. Click **Analyzer** --> **Sensor** --> **02S-ZR and Titania**;
6. Waveform will be displayed on the screen depending on measure conditions.
7. You can adjust to cycle, amplitude, coupling, reversed-phase, and cursor. If the cycle locates at high-frequency section, the triggering channel and triggering modes can be adjusted.
8. You can print measured data, load snapshot data and reference waveform data, save current configuration or acquire old configuration, automatically adjust the amplitude, snapshot current waveform and waveform comparison;
9. You can check the details of current waveform by clicking “Pause” button. After click, the button turns to “Start”, click it again to carry forward measurement.
10. You can record a continuous waveform section by clicking “Record” button.

11.6.2.4 Waveform Analysis

Now, oxygen sensors installed on ordinary electronic control vehicles are of zirconium dioxide type, and the voltage range of output signal is 0~1V, while the output signal of some zirconium dioxide type oxygen sensors is variable voltage signal of 5V, for instance, some Cherokee vehicles of old types. Please pay attention to the differences when testing. Reference waveform of ordinary zirconium type oxygen sensor is shown in Fig.12.

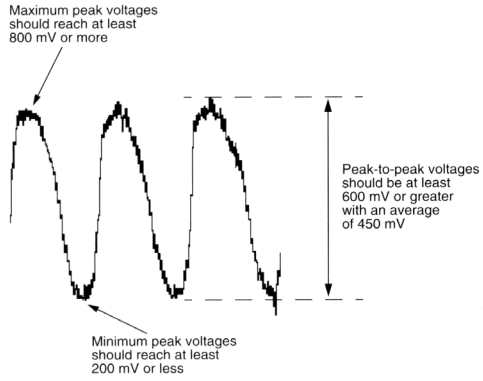


Fig. 12: Reference waveform

11.6.3 Double oxygen sensor

Two oxygen sensors provide output voltage of oxygen content in exhaust gas before and after catalyst. The front sensor signal is used as feedback signal for mixed control, and the rear sensor signal is used to test catalyst efficiency for ECU. Since catalyst efficiency may decrease due to long time use and the amplitude of rear sensor signal increases, the ability of catalyst converter to convert deleterious gas can be determined by the voltage difference between the two sensors.