



# Software Installation and Calibration Manual

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## 1. Introduction

computer configuration requirements

Laptop System: Windows XP、 Windows 7、 Windows 8、 Windows10

Hard drive capacity :10G

Monitor resolution : Higher than 1024\*768

## 2. Software installation and uninstallation instructions

### 2.1 Software installation

Open the CD or compressed package as below pictures:



Double-click the “setup”, the program will be installed automatically.

### 2.2 Software uninstallation

Uninstallation steps:

Open the control panel, choose “uninstall a program



Choose “ECU\_V5.0” from program listing, right click to choose “uninstall”

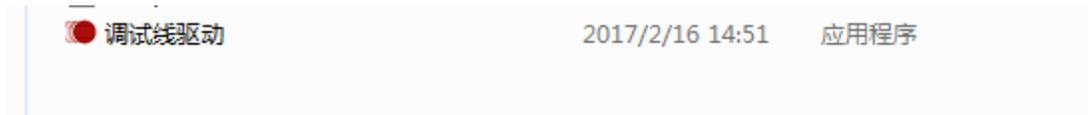
After confirm, the software will successfully be uninstalled.

### 2.3 USB Driver Installation.

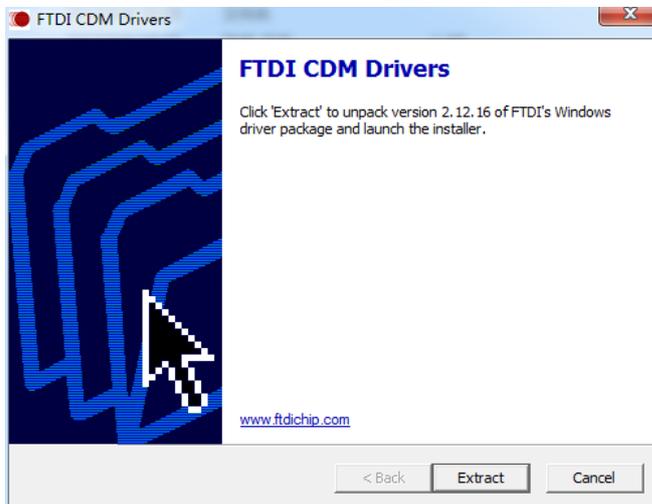
Installation steps:

Double-click the driver ( as picture 1 ) , Choose “Extract”( as picture 2)

Picture1

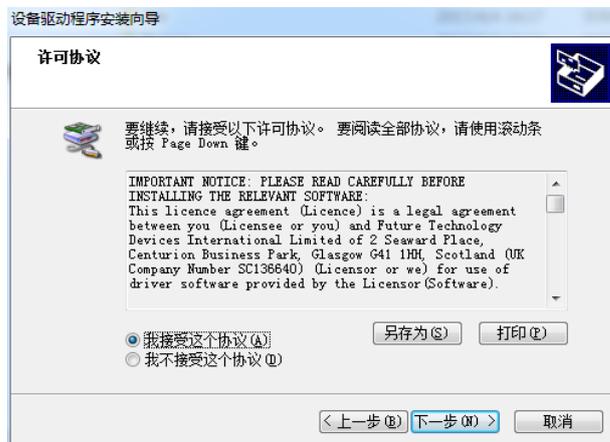


Picture2



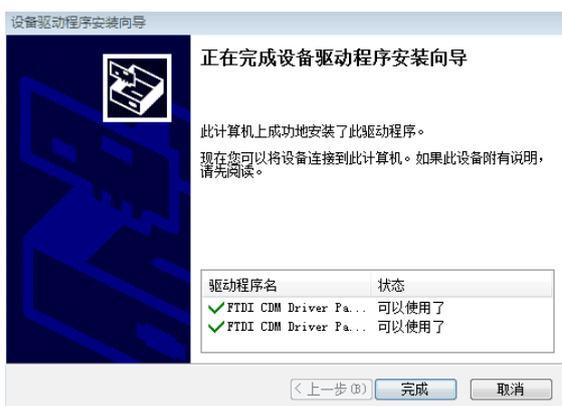
Choose "I accept this agreement" then click "Next" (as picture 3)

Picture3



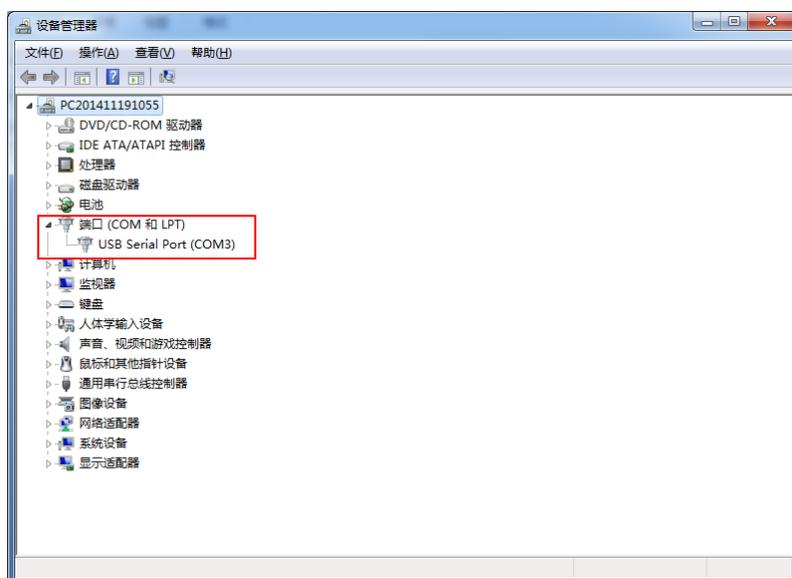
After "finish", the drive will successfully be installed ( as picture 4 )

Picture4



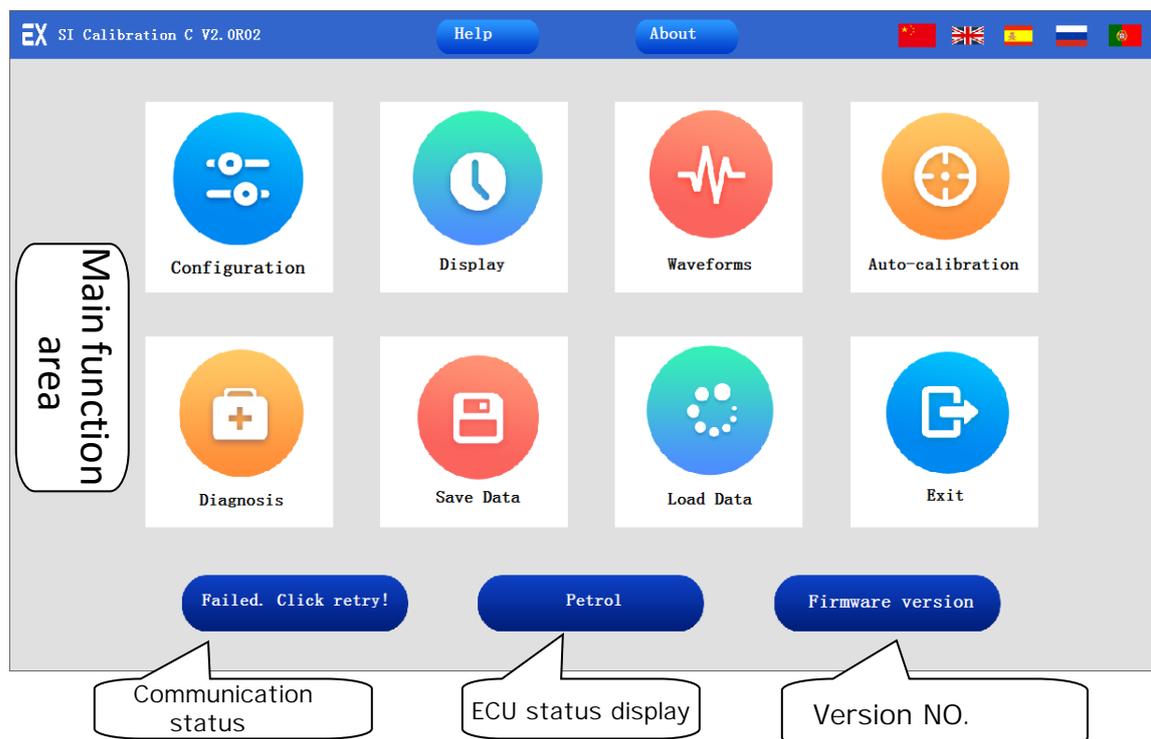
Connect laptop with USB cable, Device manager showing COM means laptop and USB cable communicating successfully. (as picture 5)

Picture 5



### 3. Software Basic Function Instruction

#### 3.1 Software Main Page



### Instruction of the function block and functional description

Communication status	Display the connection status of the software and ECU, click it to restart the connection
ECU status display	Display the status of "Petrol or Gas" status from ECU, left click can change between the petrol mode and gas mode, double right click can be forced to gas mode
Version NO.	Display the ECU version No
Main function area	
Configuration	ECU setting and calibration
Display	Display main data
Wave	Waveform display various data from the ECU
Auto-calibration	Do Automatically calibration on the parameters to match with the vehicle.
Diagnosis	Display the gas system running status
Save the data	Save the parameters of the current vehicle settings (It should be in the normal communication condition between ECU and software)
Load data	Load and save Settings parameters (It should be in the normal communication condition between ECU and software)
Exit	Exit the software

### 3.2 The Basic Setup Instructions

Function selection area: Choose the function button to enter the corresponding function module.

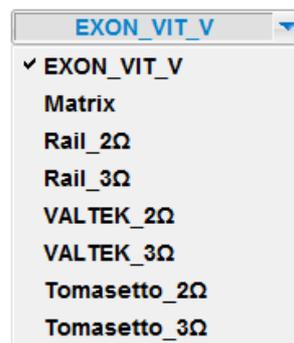
Data selection area: Set the parameter data in the function module.

Data displaying area: display Real-time data from engine.

### 3.2.1 The Basic Parameters

The function block mainly set the system sensor configuration

- a. Engine cylinders: 3 or 4 cylinder two options, choose according to the actual circumstance of the car.
- b. Engine type: Natural Aspirator or Turbo Charge two options, choose according to the actual circumstance of the car.
- c. Start and stop mode: when the car with a start-stop function are running the start-stop function, if the engine stops running more than 5 minutes, the engine start with oil and then to change to gas; if less than 5 minutes, the engine will start directly with gas.
- d. Fuel type: CNG or LPG two option, choose according to the real conditions.
- e. RPM signal: ignition signal or petrol signal two option, choose according to actual connection; the system defaults to ignition signal, to make RPM signal more accuracy.
- f. Ignition signal type, Choose 5V or 12V, according to the vehicle point signal voltage, ECU can't collect right RPM signal if Choose wrong.
- g. Ignition coil type: single ignition coil (independent ignition) or double ignition coil optional ignition (a group) two option , choose according to the actual vehicle; to adjust the parameter to make RPM in software same with car dashboard RPM.
- h. Temperature reducer signal:4.7K or 10K two option, the system defaults to 4.7K.
- i. Injector Type: injector type installed and injector type choose in software should be same, otherwise it will be damaged, the system defaults to E-XON\_VIT\_V.



- j. Switch type: LED switch or digital switch two options, choose according to the real conditions. If system use digital switch and high pressure sensor, please Choose digital. If system use LED switch and meter, Choose LED.
- k. Gas level sensor type



HPS01 is CNG high pressure sensor, power voltage 5V, output signal 0.5-4.5V.

G02-3 is CNG pressure gauge, power voltage 5V, output signal 5V-0V

AEB1050 is LPG sensor, resistance range 4.7 kilohm.

AEB1090 is LPG sensor, resistance range 0 to 90Ω.

### 3.2.2 change over



## 1. Petrol to gas

a. Engine speed: The minimum RPM of the engine from petrol to gas, the system defaults 1500rpm / min. Fuel will be automatically changed to gas from petrol when RRM is more than 1500 rpm/min.

b. Reducer tempt: Engine's Minimum water temperature requirement from petrol to gas, the system defaults 40°C .

It means reducer temperature must reach to this setting value, then the engine can change to gas.

-- If setting temperature too low, engine can't run normally because reducer preheating not enough make the gas outlet is not enough.

-- If setting temperature too high, the engine change from petrol to gas time will be delayed.

c. Overlapping time: The Minimum waiting time from engine starting (petrol) to gas, the system defaults to 10s.

d. Minimum Gas pressure from Petrol to gas: Gas pressure requirement from petrol to gas. the system defaults 1.8bar for CNG and 1.4bar for LPG.

e. Change over type

RRM accelerate: It means when engine RPM exceeds engine speed setting, the fuel will change from petrol to gas.

RPM deceleration: It means when engine RPM exceeds the engine speed setting, then goes down to engine speed setting, the fuel will change from petrol to gas.

f. Change sequence

Sequential switching: changing from petrol to gas according to engine cylinder sequence

Simultaneous switching: each cylinder of engine change from petrol to gas at the same time, usually we can try this function when vehicle appears shaking from petrol to gas.

In the process of engine from petrol to gas, gas ECU first check whether the water temperature reaching to the setting value and then check minimum gas pressure reaching to the setting value. After they both reaching to the setting value, the red and yellow lights of the switch both flash and warn at meantime. Press the accelerator, engine RPM reach setting speed. After all the requirements are met, the engine will change the petrol to gas.

## 2. Operation at minimum/maximum

a. Petrol Use of Engine Speed

Switch to petrol automatically when RPM exceed the setting RPM

b. Petrol Use of Injection Time

Switch to petrol automatically when petrol injection time exceed the setting petrol injection time

c. RPM for identifying

Set the minimum petrol RPM

d. RPM minimum Operation

Petrol engine is in petrol model when RPM under the setting RPM, switch to gas when RPM exceed the setting RPM

Return to petrol switch to petrol when RPM under the setting RPM, switch to gas automatically after 20 cycles in petrol

## 3 . Gas to Petrol

Minimum gas pres( bar): When the gas pressure is lower than setting value, the engine will change from gas to petrol, the system defaults 1.2 bar for CNG, 0.8 bar for LPG.

### 3.2.3 Map calibration table

Map calibration table: calibrating the gas injection time.

The screenshot shows a software interface for MAP calibration. On the left, there is a vertical menu with buttons: Parameter, Change over, MAP, More function, ECU Reset, OBD Communic., and OBD Adapt. Below this menu is a small digital display showing '200'. The main area contains a 'MAP table' with a 'Main ratio' dropdown set to '0%' and a 'MAP reset' button. The table has 13 columns for RPM (1000 to 6500) and 13 rows for Tinj/RPM (2.0 to 18.0). All cells in the table contain the value '0'. Below the table are buttons for 'MAP', 'Offset', 'T.red. cali.', 'Pressure cali', and 'T.gas cali'. At the bottom, there are several status indicators: RPM (0), Tinj.petrol (0.00), Tinj.gas (0.00), Pres.gas (0.00), T.reduce (0), ECU Status (Petrol), OBD Connect (Failed), Fuel Trim Long (0.00), Fuel Trim Short (0.00), MAP (0.00), T.gas (0), and Lambda (0.00).

MAP table

Main ratio  MAP reset

Tinj/RPM	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500
2.0	0	0	0	0	0	0	0	0	0	0	0	0
2.5	0	0	0	0	0	0	0	0	0	0	0	0
3.0	0	0	0	0	0	0	0	0	0	0	0	0
3.5	0	0	0	0	0	0	0	0	0	0	0	0
4.5	0	0	0	0	0	0	0	0	0	0	0	0
6.0	0	0	0	0	0	0	0	0	0	0	0	0
8.0	0	0	0	0	0	0	0	0	0	0	0	0
10.0	0	0	0	0	0	0	0	0	0	0	0	0
12.0	0	0	0	0	0	0	0	0	0	0	0	0
14.0	0	0	0	0	0	0	0	0	0	0	0	0
16.0	0	0	0	0	0	0	0	0	0	0	0	0
18.0	0	0	0	0	0	0	0	0	0	0	0	0

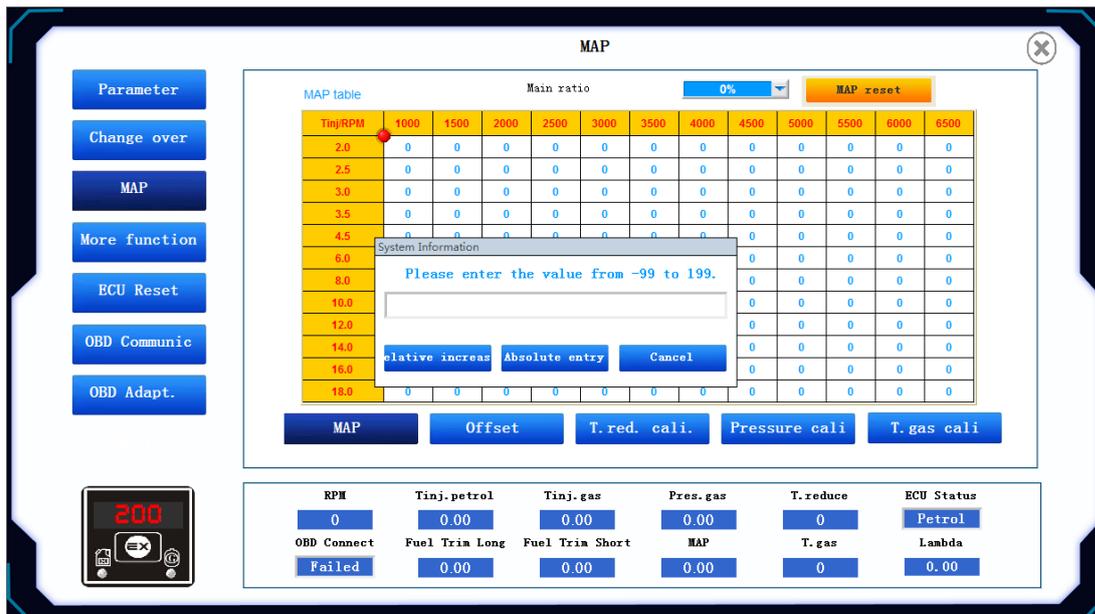
a. MAP calibration

X-axis : engine speed(rpm)

Y-axis : petrol injection time (ms)

Z-value: correction of Gas injection time(%)

The green EspBox in MAP table display the engine RPM and relative position of the injection time.



### MAP Table calibration ways:

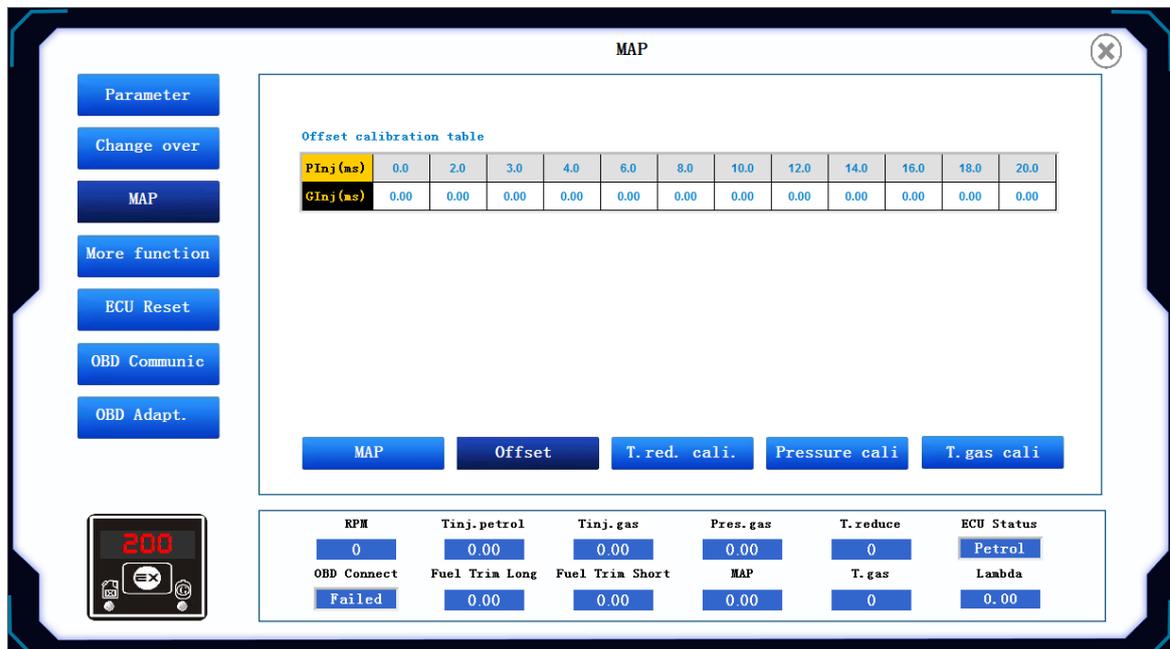
Click and hold the left mouse button to drag the mouse to select which we need to modify the area, release the left mouse button pop-up dialog according to fill in the set values. Software "relative increase" and "absolute input" button, click on the "relative increase" button, fill in the values will be stacked to MAP each selected parameters (enter the same as the function of "relative increase"), click on the "absolute input" button, each parameter value of the selected area will be set to fill in the values.

If we need revise a single parameter in MAP table, double-clicking the parameter with the left mouse button will appear two arrows, arrow up is to increase, arrow down is to reduce, to adjust to desired values by clicking on the arrow.



- b. main ratio: The correction percentage of gas injection time under all operating conditions ( % )
- c. MAP Reset  
Restore the MAP data to factory Settings
- d. Offset calibration

The gas injection time can be adjusted quickly according to the different petrol injection time, to meet the needs of engine under different conditions. It can solve the car engine under the same conditions but speeds under different conditions of motivation and emissions.



Plnj(ms) : petrol injection time (ms)

Glnj(ms) : Gas injection time (ms)

$$Glnj(ms) = Plnj(ms) * K(\text{adj}) + b(\text{offset})$$

$$Glnj(ms) = Plnj(ms) * K(\text{adj}) + b(\text{offset})$$

$$Glnj(ms) = Plnj(ms) * K(\text{adj}) + b(\text{offset})$$

e. water temperature calibration



z-axis: Gas injection time revised (%), due to the different temperature under the same pressure but gas density difference, according to the change of the pressure reducer temperature, corresponding correction gas injection time.(at high temperature, gas density is small, low temperature, gas density)

°C: engine water temperature

% : gas injection time correction

According to adjusting the different engine water temperature, due to the water temperature decreases, the density of gas will increase and the gas injection correction will decrease accordingly. Guaranteeing the stability of engine in low temperature area is also beneficial to reduce the gas consumption.

f. Pressure calibration

MAP

Pressure calibration table

MAP/GasP (bar)	1.0	1.5	2.0	2.5
0.5	100	100	100	100
0.5	100	100	100	100
0.8	100	100	100	100
1.0	100	100	100	100

RPM	Tinj.petroil	Tinj.gas	Pres.gas	T.reduce	ECU Status
0	0.00	0.00	0.00	0	Petrol
OBD Connect	Fuel Trim Long	Fuel Trim Short	MAP	T.gas	Lambda
Failed	0.00	0.00	0.00	0	0.00

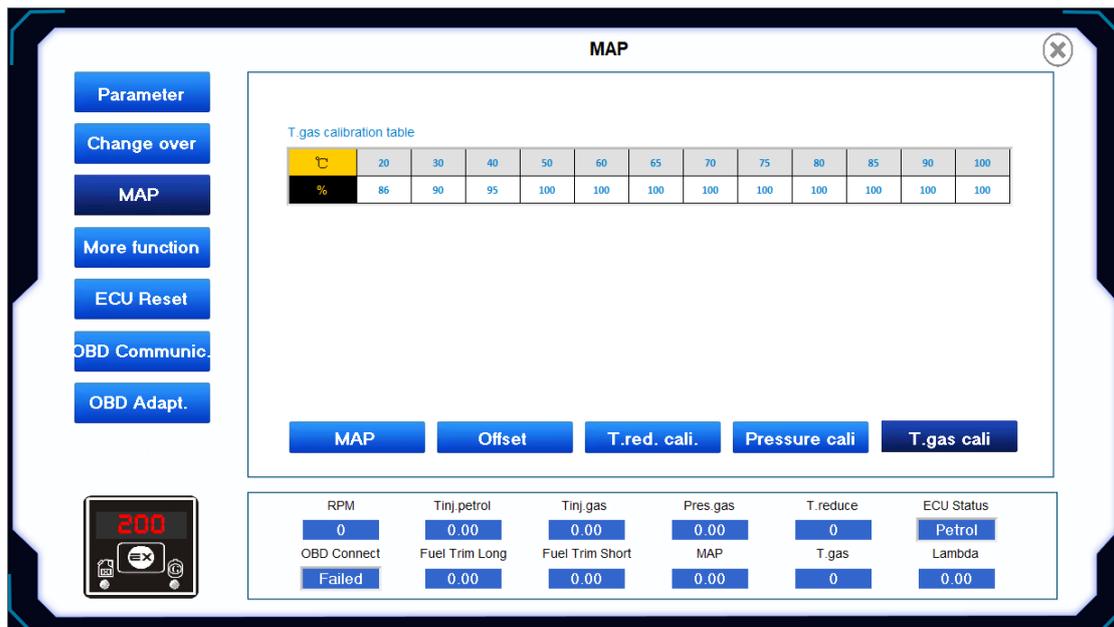
X-axis : gas pressure (bar)

Y-axis : MAP pressure (bar)

Z value :correction value of gas injection time (%)

Because the gas output pressure is a dynamic process, the gas density increases relatively when the output pressure is high, so it is necessary to attenuate the gas injection time to make the lower output pressure to reduce the gas density. It is necessary to increase the gas injection time. CNG normal setting pressure is 1.8bar, LPG is 1bar.

g. T.gas calibration

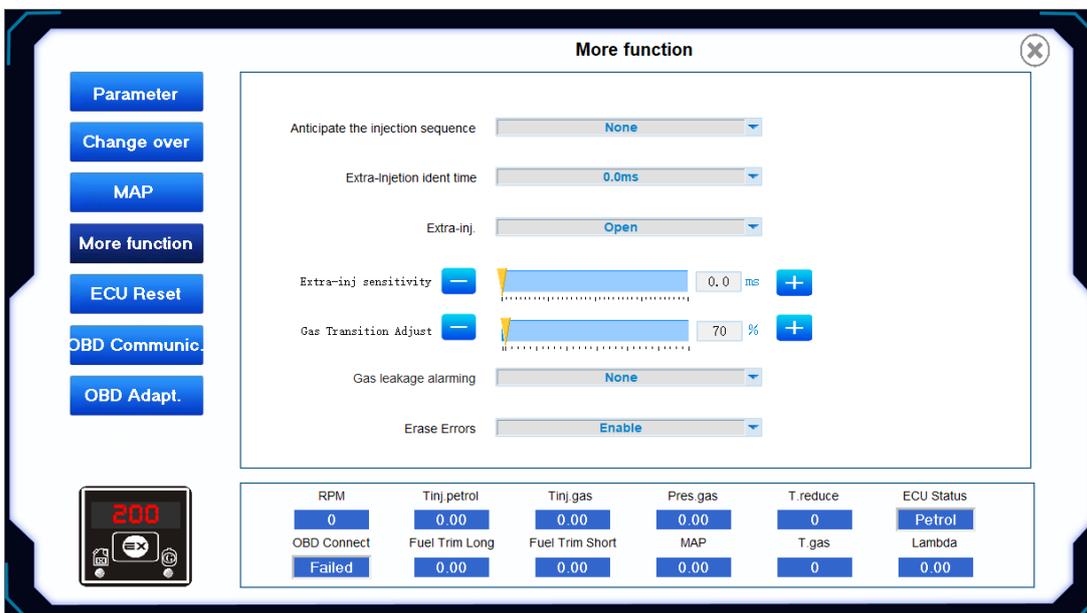


X-axis :gas temperature ( °C)

Z value :correction value of gas injection time (%)

As the gas is constantly flowing and changing , the gas temperature is not a constant value, when the temperature decreases, the density of gas will increase and the gas injection correction will decrease accordingly. The density of gas will decrease as the temperature increase, and the gas injection correction will increase accordingly.

### 3.2.4 More function:



a. Anticipate the Injection sequence: It has the option of none,1,2,3, adjusting through these 3 selection when injection pipe is longer or car jerk in constant speed.

b. Extra-Injection ident time: This function is to set up ECU identify additional injection time, when the injection time is less than the set value ECU judgement for additional injection.

Additional injection time set judgment method: in the process of cars in urgent to accelerating, the dot in the map table occasionally suddenly from the big Tinj.petrol suddenly jumping to the small Tinj.petrol, the observed value of Tinj is the additional injection time Value.

c. Extrainj: It will filter out the petrol extra-injection signal when choose “cutting”. It will appear “Extrainj sensitivity” when choose “open”, ECU will calculate according to the petrol extra-injection signal, Injection time = Extra-Injection time + Extrainj sensitivity time.

d. Gas Transition Adjust: deal with the injection time when rapid acceleration. In general, CNG less, LPG more. Adjusting coverage is 70%-130%, 70% means injection time decrease by 30%, 130% means injection time increase by 30%

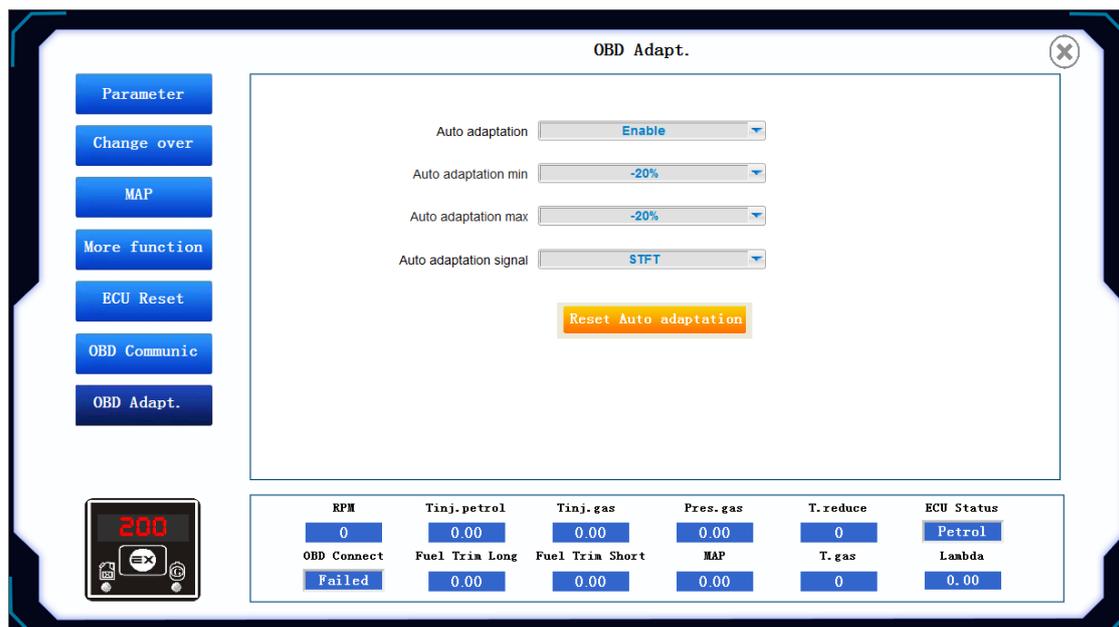
e. Gas leakage alarming: It needs match with the gas leak sensor. When the gas leak, the switch will make warning until the leak signal disappear.

f. Reset errors: It has the option of enable or disable, If Choosing “enable”, It can clear the original ECU inner fault code.

### 3.2.5 Reset ECU:

To restore the ECU factory Settings

### 3.2.6 OBD Adaptation:



OBD Adaptation: used for setting OBD auto adaptation parameters.

A. Real-time Cali. Choose Enable or Disable to open or close OBD auto adaptation function.

B. Auto adaptation min: the minimum value of gas ECU injection time in the direction of decreasing is -20%, and the defaults is -10%

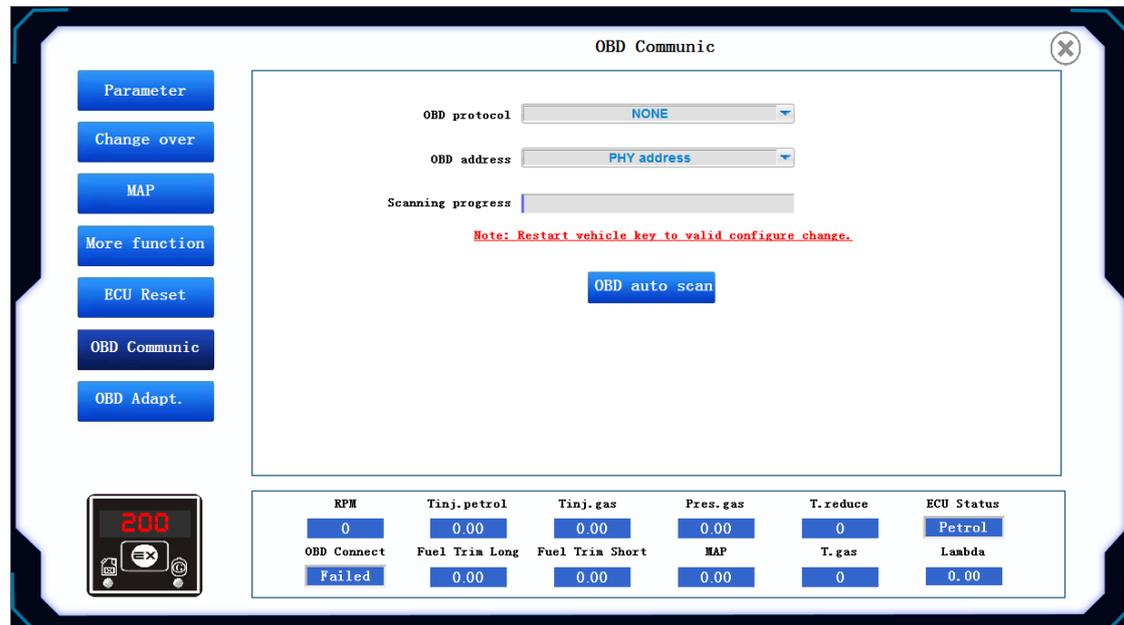
C. Auto adaptation max: the maximum value of gas ECU injection time in the direction of increasing is +20%, and the defaults is +10%

D. Auto adaptation signal

STFT: Short Term Fuel Trim (%)

STFT\_LTFT :Short Term Fuel Trim (%) + Long Term Fuel Trim (%)

### 3.2.7 OBD Communication:



OBD Communication: Gas ECU communicate with original ECU through OBD connector.

If the communication protocol of original ECU is not clear, you can choose "OBD automatic scanning" software try to connect to original ECU automatically. It will appear connection success prompt after the connection!

If the communication protocol of original ECU is clear, the corresponding communication protocol can be selected manually, which is more efficient.

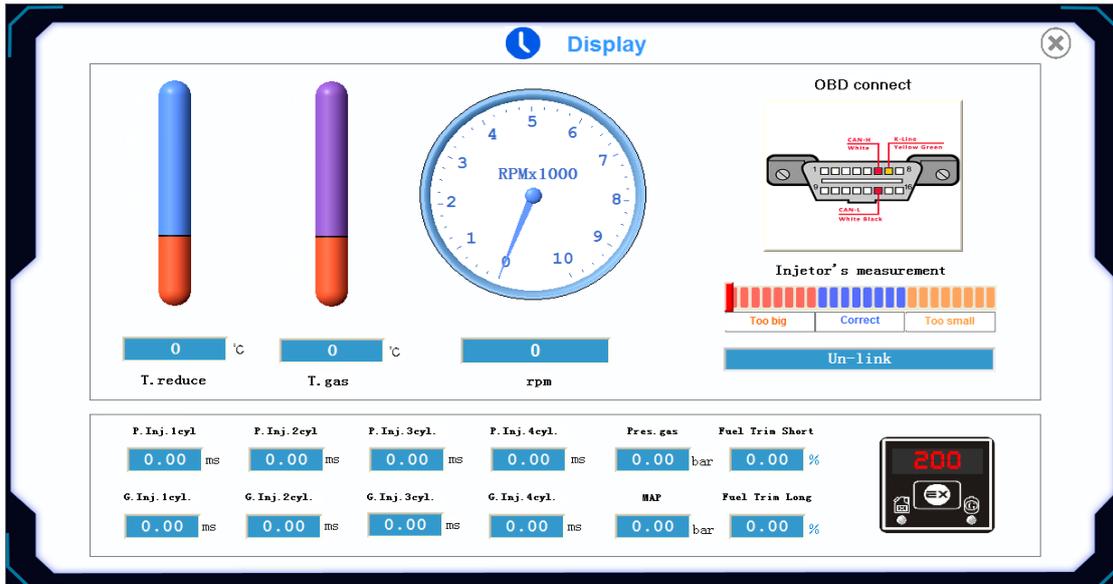
Pay attention: After connection, we must turn off the key and wait change over switch to go out, then open the key door, Only this way internal communication protocol of gas ECU be modified successfully. These are Normally OBD communication protocol method.

OBD address type: Generally, to use the defaults "physical address". If the above communication protocol is all fault connecting, you can modify the OBD address type to "broadcast address" to connect.

ISO15765\_11B\_500K\_CAN  
 ISO15765\_29B\_500K\_CAN  
 ISO14230\_5B\_KL  
 ISO9141\_5B\_KL  
 ISO14230\_Fast\_KL

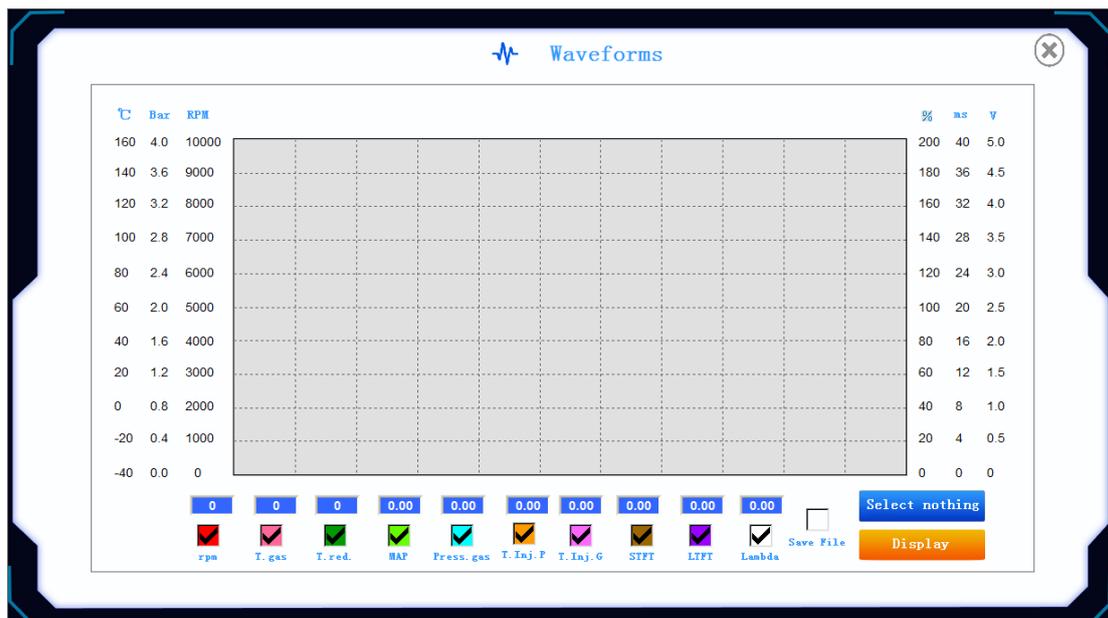
OBD communication methods on general for five as above.

### 3.3 Display:



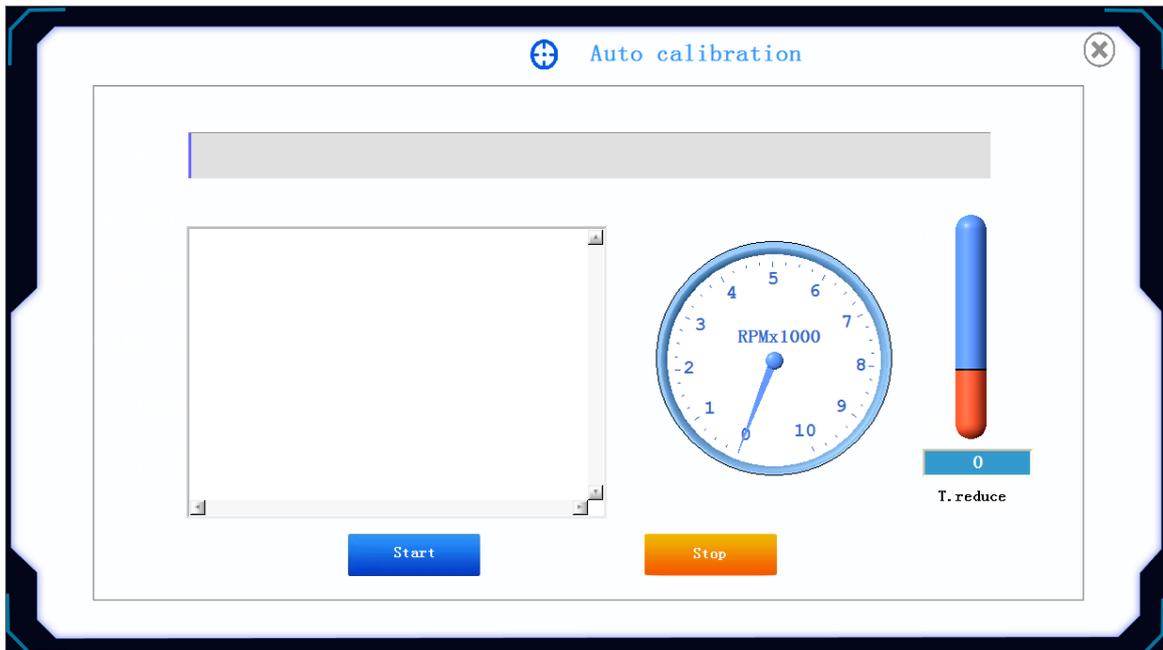
Engine runtime key parameters real-time display, easy to observe the engine operation.

### 3.4 Waveform:



Selected the observe signals which we needed (check), the corresponding signal information will be displayed. If we check the "file save", and click "wave stop", the excel will appear, which will record the data from software.

### 3.5 Auto –calibration:



Auto-calibration : software and gas ECU automatic matching process of the vehicle.

The system will start the Auto -calibration while the water temperature is more than 60 °C . according to the instructions to run the throttle.

Before the Auto-calibration, it need do a preliminary matching the engine power with the hole of rail injector nozzle. As the following table.

Injector aperture and engine power corresponding diagram

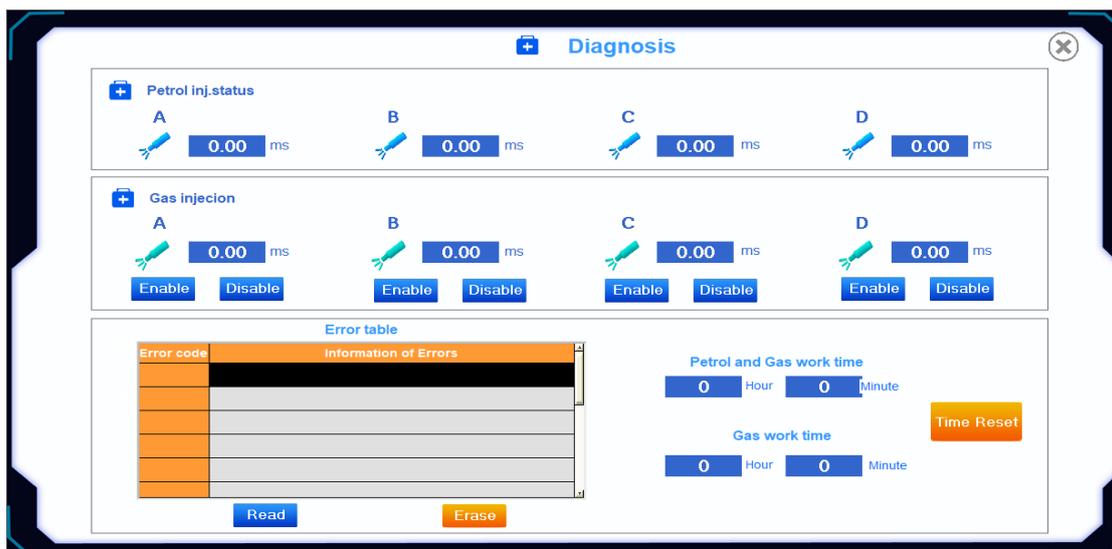
CNG

Nozzle: Diameter: boquilla diámetro	Signal cyl. Power (kw)			
	10kw-15kw	15-20kw	20-25kw	25-30kw
VIT-V 2 Ω	1.6—1.8	1.8—2.2	2.2—2.4	2.4—2.8
VIT-V 3 Ω	1.6—1.8	1.8—2.2	2.2—2.4	2.4—2.8
MATRIX	1.8—2.0	2.0—2.4	2.4—2.6	NA
RAIL 2 Ω	1.6—1.8	1.8—2.2	2.2—2.4	2.4—2.8
RAIL 3 Ω	1.6—1.8	1.8—2.2	2.2—2.4	2.4—2.8
VALTEK 2 Ω	1.6—1.8	1.8—2.2	2.2—2.4	2.4—2.8
VALTEK 3 Ω	1.6—1.8	1.8—2.2	2.2—2.4	2.4—2.8
TOMASETTO 2 Ω	1.6—1.8	1.8—2.2	2.2—2.4	2.4—2.8
TOMASETTO 3 Ω	1.8—2.2	2.2—2.4	2.4—2.6	2.6—2.8

LPG

Nozzle: Diameter: boquilla diámetro	Signal cyl. Power (kw)			
	10kw-15kw	15-20kw	20-25kw	25-30kw
VIT-V 2 Ω	1.5—1.7	1.7—2.1	2.1—2.3	2.3—2.7
VIT-V 3 Ω	1.5—1.7	1.7—2.1	2.1—2.3	2.3—2.7
MATRIX	1.7—1.9	1.9—2.3	2.3—2.5	NA
RAIL 2 Ω	1.5—1.7	1.7—2.1	2.1—2.3	2.3—2.7
RAIL 3 Ω	1.5—1.7	1.7—2.1	2.1—2.3	2.3—2.7
VALTEK 2 Ω	1.5—1.7	1.7—2.1	2.1—2.3	2.3—2.7
VALTEK 3 Ω	1.5—1.7	1.7—2.1	2.1—2.3	2.3—2.7
TOMASETTO 2 Ω	1.6—1.8	1.8—2.2	2.2—2.4	2.4—2.8
TOMASETTO 3 Ω	1.7—2.1	2.1—2.3	2.3—2.5	2.5—2.7

### 3.6 Diagnosis



Fuel injection signal status: show gasoline injection signal collecting, whether it is right the green signal collected, red no collected signal.

Gas injection allowed: The button of selecting the corresponding cylinder can close the injection of this cylinder, and open the corresponding petrol injection signal. Green is normal injection, red is closed injection.

Fault code table: displaying the gas system component failure.

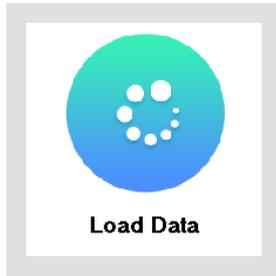
### 3.7 Save the data:



Save gas ECU data to PC.

### **3.8 load data:**

To save PC data is loaded into the gas in the ECU.



### **3.9 Exit**



Click Exit to close the software.



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Wechat

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Loyalty, diligence, cooperation, innovation and achievement are the soul of our company.