APPRO2
Mercedes-Benz
FBS1-FBS3 System
IMMO Matching Instructions

Ver:1.0

APPRO2-Instructions for Mercedes-Benz Tools

APPRO2-Instructions for Mercedes-Benz Tools

Instructions for APPRO2-MB TOOL

May 2019

Version Ver 1.0

1. Document declaration

Please read the following statement carefully:

- APPRO2-MBTOOL documentation is only available to assist APPRO2-MBTOOL equipment in servicing vehicles. Please observe national laws and do not use for illegal purposes.

- Unauthorized use of this document and the APPRO2-MB TOOL tool is at the user's risk and without any liability on the part of the manufacturer of this device.

- The APPRO2-MB TOOL documentation can help you learn to use the APPRO2-MB TOOL tool as soon as possible. Please read it carefully

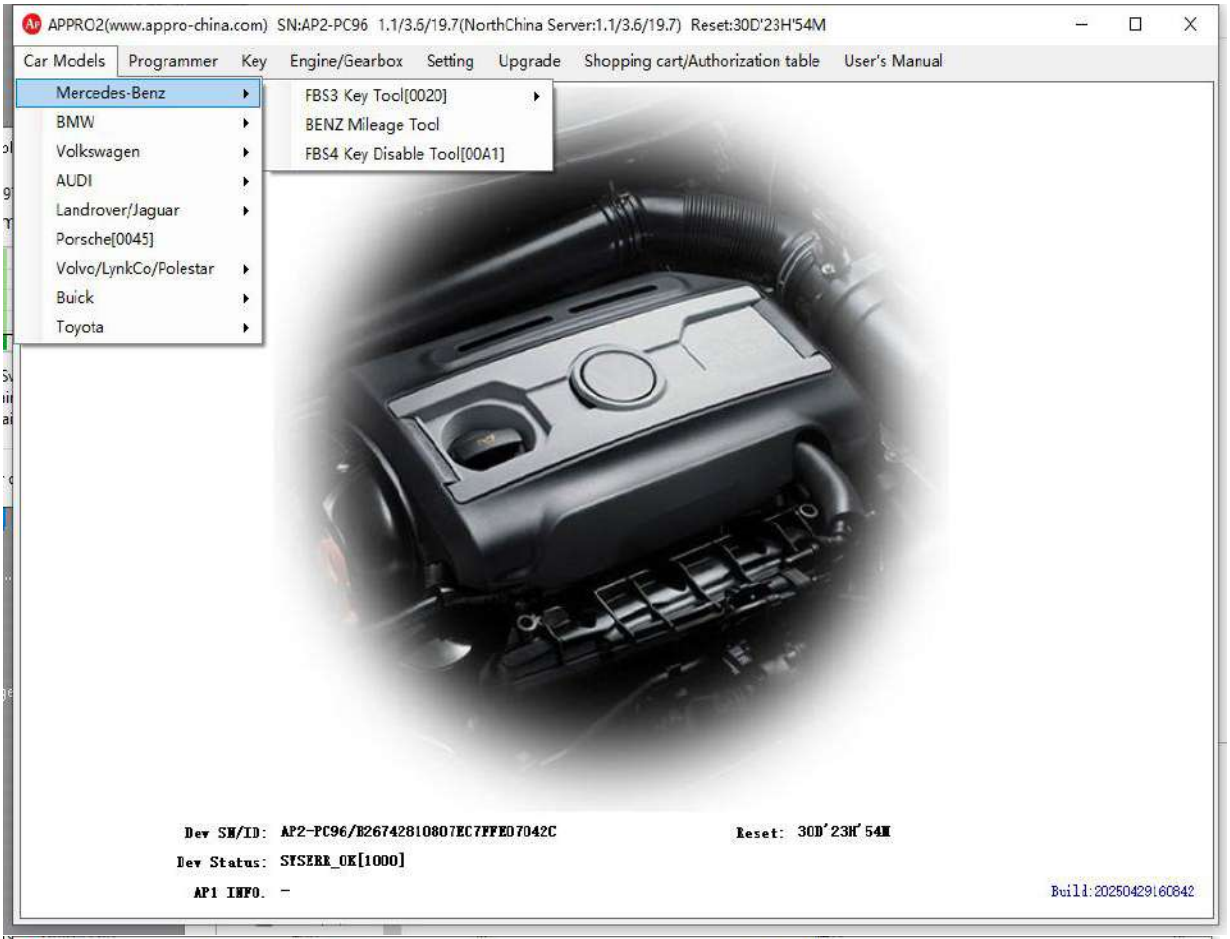
2. Introduction

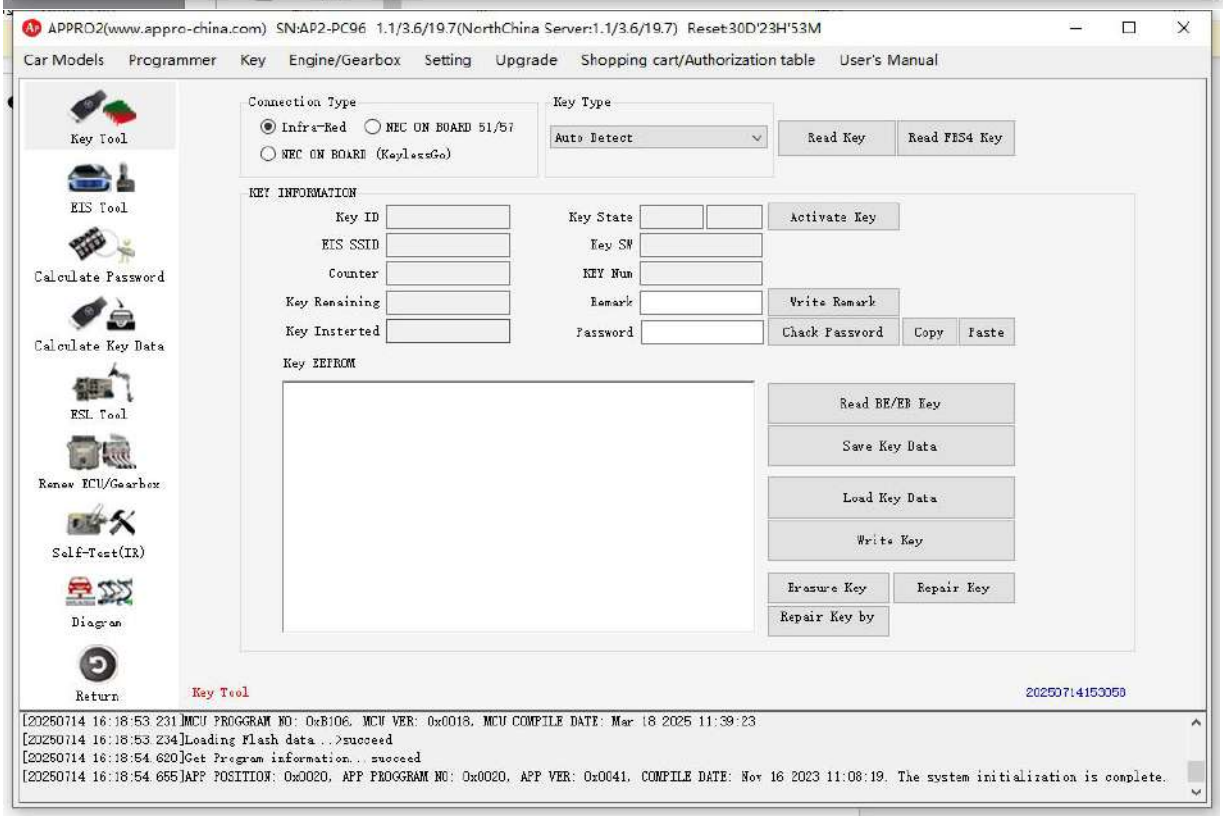
APPRO2-MB TOOL Hardware Device

1. APPRO2 host 5. NEC adapter 51/57 (non-intelligent)
2. Infrared adapter 6. NEC adapter Key lessGO (smart)
3. OBDII cable 7. NEC chip solder board
4.USB cable

APPRO2-Instructions for Mercedes-Benz Tools

APPRO2-MB TOOL Software Interface





3. Interface introduction

3.1 Key tool

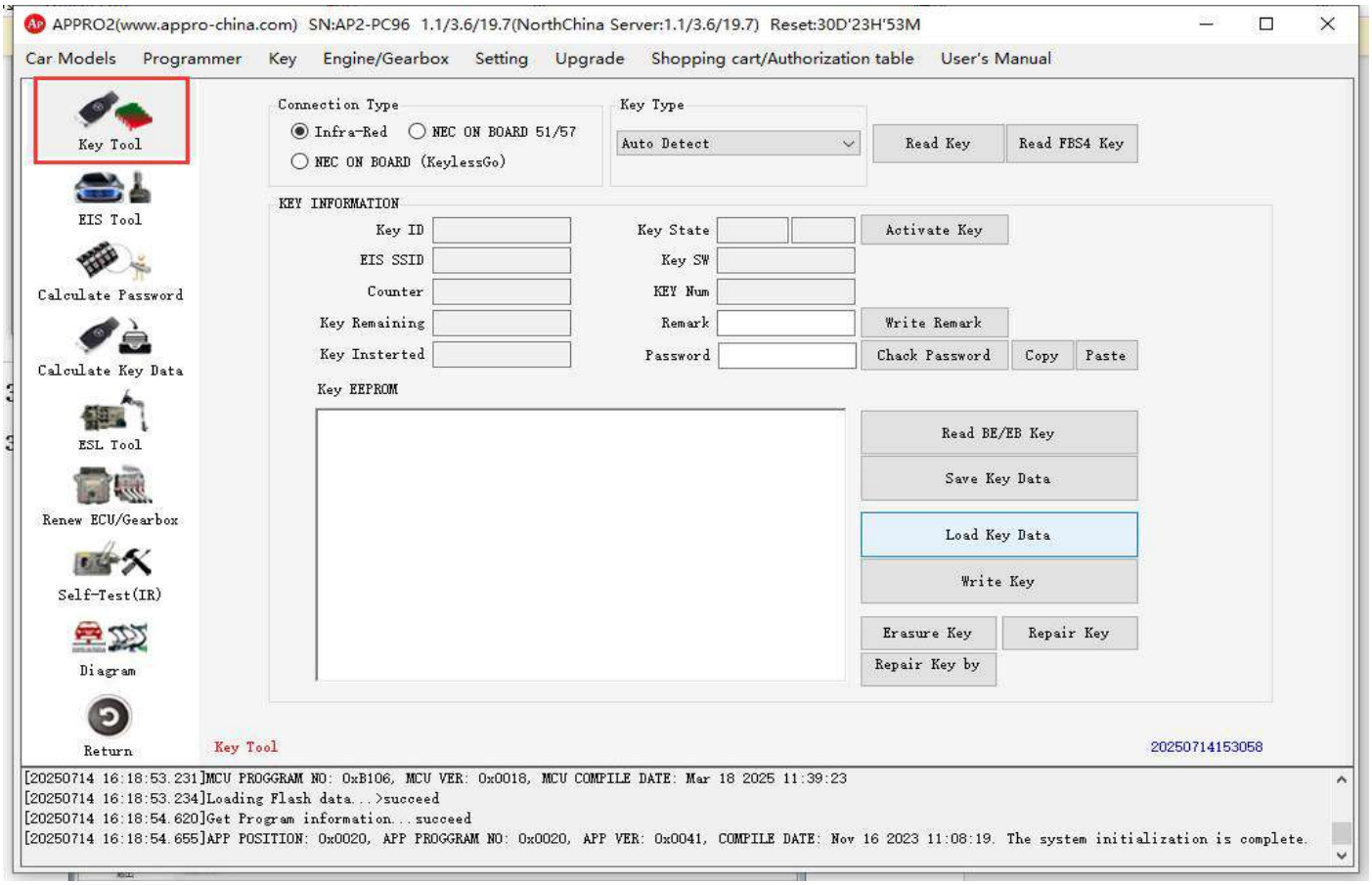


Figure 3.1 Key Tool

3.1.1 Operating instructions

- **Identify the key:** identify and read the basic information of the key placed in the APPRO2 key programming seat;
- Key information parameters:
- **Key ID:** ID of the current key
- **lock SSID:** the current key belongs to the SSID of the corresponding lock
- **Type:** which type does the current key belong to? At present, it is divided into the original factory NEC, the original factory BGA and the subsidiary factory key.
- **Counter:** the counter of the key, which is decremented by 1 after completing one authentication
- **Key position:** identify the channel number of the current key in the lock.
- **Available times:** the difference value of decrementing the counter to 0

- **Status:** indicates whether the current key is used. When its value is 21DF, it is a blank key.
- **Used times:** the total number of authentication times of the current key
- **Version:** ROM version of the key, equivalent to the type (Note: status and version are important signs for us to identify the current key)
- Read BE/EB key information: read all the current BE/EB key EEPROM data, including the key password
- **Key password:** when the EEPROM data of the key is read out, the password of the current key is automatically identified, which is convenient for the user to copy.
- **Save the key file:** save the read key EEPROM as a file.
- **Erase:** erase the auxiliary factory key BE/EB to restore its status to 21DF blank status.
- **Write:** Write the loaded key file to the blank key (status is 21DF) (APPRO2 supports the IR write of all factory NEC keys that have been erased)
- **Infrared repair key: omitted**
- **Code hopping repair:** select to repair the code hopping data when the key or lock fails to open the ignition due to code hopping.

- **Identify the FBS4 key:** Identify the BGA key of the latest IMMO FBS4 of Mercedes-Benz.
- NEC adapter 51/57: support V28, V35, V51, V57 type NEC key chip erase and key data write
- **NEC adapter KelessGo:** supports the following types of NEC key chip erase and key data write

● V40, V03, V06, V08 (smart key)

● V05, V07, V09 (smart key)

● V59, V61 (smart key)

3.1.2 Key type

The basic information of the key can be identified through "Identify the key": SSID, counter, available times, used times, key position, key status, key version, etc.

①BE/EB key

The key version is the BE/EB subsidiary key, which supports reading the password in the BE key and the original key file, writing the key file to generate the vehicle key, and erasing the used BE key.

Note: If the vehicle key is a BE key, you can directly read the key password of the BE key (save the trouble of calculating the key password online).

②. Original key

There are two kinds of keys: NEC (mainstream key before 2010) and BGA key, and the key data is written through infrared IR.

Note: Smart key is also divided into NEC (key ROM version: 03 ~ 08) and BGA (key ROM version: 62-79). The smart key of the original vehicle is of BGA type and cannot be replaced by the smart key of NEC.

Note: At present, FBS3 intelligent auxiliary factory keys supporting 221, 216 and 164 have appeared in China, and APPRO2 also supports writing.

Note: APPRO supports the generation of key files in two formats: v051 and v041. However, when using the key file programming, only the v051 file is supported for key programming. That is, when using APPRO2 for key programming, no matter whether the key is a smart key or not, the v051 file is used!

3.2 EIS Tool I

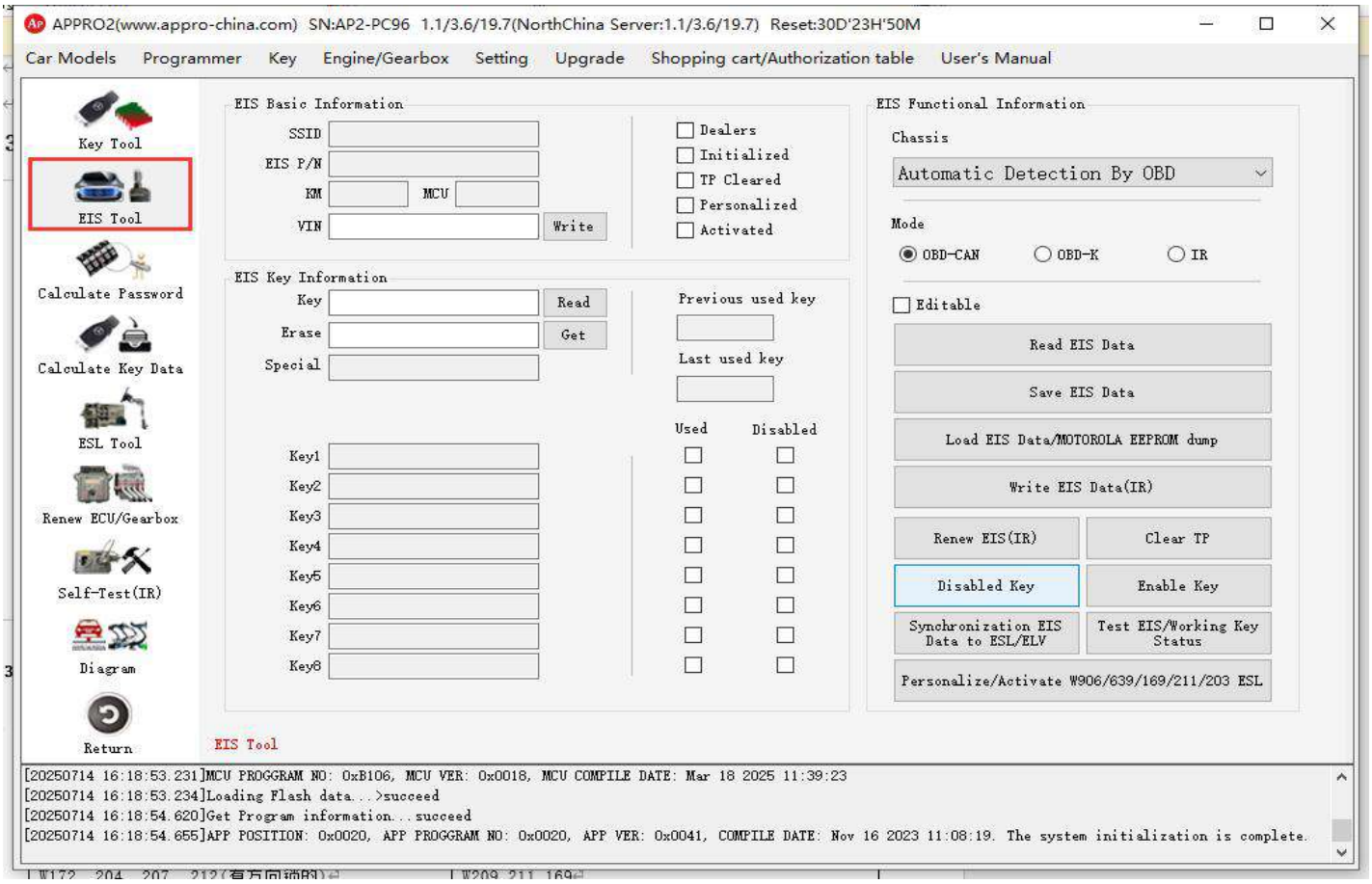

APPRO2(www.appro-china.com) SN:AP2-PC96 1.1/3.6/19.7(NorthChina Server:1.1/3.6/19.7) Reset:30D'23H'50M
Car Models
Programmer
Key
Engine/Gearbox
Setting
Upgrade
Shopping cart/Authorization table
User's Manual
Key Tool
EIS Tool
Calculate Password
Calculate Key Data
ESL Tool
Renew ECU/Gearbox
Self-Test(IR)
Diagram
Return
EIS Basic Information
SSID
EIS P/N
KM
MCU
VIN
Write
Dealers
Initialized
TP Cleared
Personalized
Activated
EIS Key Information
Key
Erase
Special
Read
Get
Previous used key
Last used key
Used
Disabled
Key1
Key2
Key3
Key4
Key5
Key6
Key7
Key8
EIS Functional Information
Chassis
Automatic Detection By OBD
Mode
OBD-CAN
OBD-K
IR
Editable
Read EIS Data
Save EIS Data
Load EIS Data/MOTOROLA EEPROM dump
Write EIS Data(IR)
Renew EIS(IR)
Clear TP
Disabled Key
Enable Key
Synchronization EIS Data to ESL/ELV
Test EIS/Working Key Status
Personalize/Activate W906/639/169/211/203 ESL
EIS Tool
[20250714 16:18:53.231]MCU PROGGRAM NO: 0xB106, MCU VER: 0x0018, MCU COMPILE DATE: Mar 18 2025 11:39:23
[20250714 16:18:53.234]Loading Flash data...>succeed
[20250714 16:18:54.620]Get Program information...succeed
[20250714 16:18:54.655]APP POSITION: 0x0020, APP PROGGRAM NO: 0x0020, APP VER: 0x0041, COMPILE DATE: Nov 16 2023 11:08:19. The system initialization is complete.

Figure 3.2 EIS Tool

3.2.1 Type of lock

CAN protocol:

W164	W216 ,221(2009-)
W164 2009-	W221(-2009)
W166, 197, 212,246	W639 2009-
W172, 204, 207, 212 (with direction lock)	W209,211,169
W906 2009-	

Note: Gateway support is required to read W164, W209, W211 and other locks through CAN.

K-line protocol:

W203,463,639(K)	W215,220(K)
W202,208,210(K)	W230(K)

Infrared IR Protocol:

Some locks are not supported

Note: Some locks (EIS) need gateway to communicate on the platform, such as W164 \ W164 2009- \ W211 \ W209, etc.

3.2.2 Function introduction

1. Reading lock data supports OBDII and infrared adapter (part of EIS does not support IR)

2.The OBD mode supports the automatic diagnosis of the locking head of the CAN protocol.

3. Support to erase, read and write, replace the lock, and rewrite the key information of the lock (lock jump code repair)

4.Support to write frame number

5. Support clear TP protection

6.Support to disable/enable the key

7. Support personalization/replacement of W204 direction lock ELV

8. Support the detection of lock status and car key detection

3.2.3 Operating instructions

- **Rewrite data:** This function allows the user to edit and modify the current data

- **Read the lock data:** read and save all the IMMO data of the lock except the key password, observe the data change and write the EIS data to other locks to replace the lock.
- **Save lock data:** save the read data as a file
- **Load lock data:** load file data to the host
- **Write lock data IR:** The data is written to the inactive lock through IR-KEY. The user must select the IR communication mode.
- **Erasing data IR:** to change the lock into the inactive state through IR-KEY, the key password of the current lock needs to be matched with the erasing password, and the user must select the IR communication mode.
- **Clear TP protection:** The new lock needs to remove the TP protection to write data.
- **Synchronize lock data to direction lock:** Synchronize lock data to 204 ELV. For replacement of ELV. Successful synchronization is possible only if the lock status is not active and the ELV is not active.
- **Frame number writing:** write VIN into the lock
- **Key code reading:** Some old locks support direct reading of the key code through IR. For example, the key code of W203 can be read directly by IR.

- **Erase password reading:** After reading the EIS data, it can be networked with the APPRO server to calculate the erase password.
- **Disable key:** The key that is lost or not used can be disabled. At present, only FBS1-FBS3 can be disabled by using the lock key of CAN protocol.
- **Enable key:** All disabled keys can be enabled. Key password and enable password are required. Enable by IR.
- **Detect the state of the key and the lock:** This function is mainly to read the true state inside the EIS according to the diagnostic method and observe whether the lock works normally.

3.2.4 Advanced Applications

1. Support infrared reading of the password of the old HC05 and HC08 Motorola locks. For example, the key password of W203 can be read directly through IR.

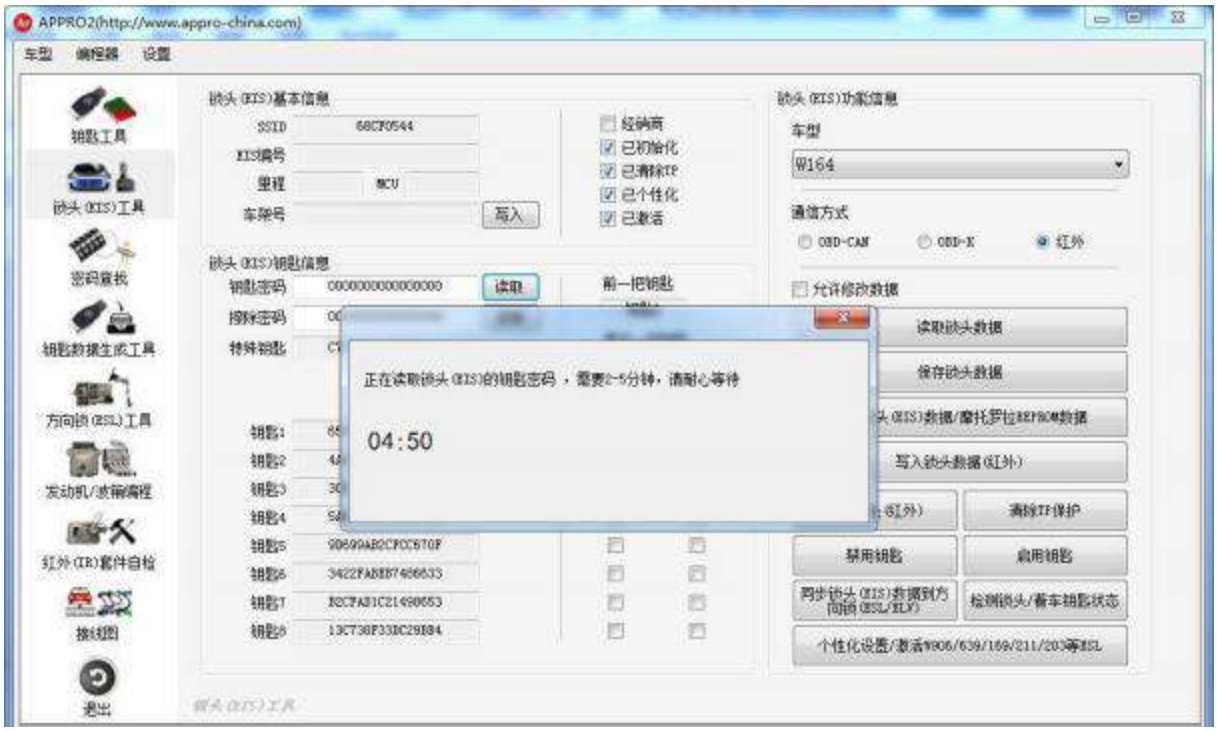


Figure 3.2.4.1 EIS lock Status

2. Explanation of Mercedes-Benz IMMO terms:

EIS/EZS: lock, ignition switch lock.

Figure 3.2.4.2 EIS/EZS

OBD communication: use OBD cable (CAN bus, K line, etc.) to connect the lock of the vehicle to obtain data;

IR communication: insert the infrared adapter (IR-KEY) into EIS/EZS to obtain data;

K-line communication: use OBD cable to connect the lock of the vehicle to obtain data, generally for older models;

Figure 3.2.4.3 Communicating with EIS/EZS Using the IR Adapter

3.2.5 lock parameters

SSID: ID of the lock, 4 bytes, key data, identifying the lock ID. Uch as 70BBB2FA;

EIS code: lock model code such as: 207 545 0108 model is 207 accessory code 545 version 0108

Mileage: Kilometers stored in EIS/EZS KM

Frame number: the vehicle VIN code stored in EIS, and the internal VIN can be overwritten by an inactive lock.

Previous key: refers to the channel number of another key that is different from the last ignition key we used;

The last key: we use the channel number of the last ignition key;

Key code: 8 bytes of key IMMO data, which is the authentication code for the communication between the key and the lock, and is the most important number of the Mercedes-Benz IMMO system

On the one hand, it can match the new key, change the direction lock, modify the EIS data and enable the key;

Erase password: 8 bytes of key data, which can erase the activation identification of the EIS lock with the key password, so that the EIS can rewrite data.

Special key: also called special hash. This is the index value stored in the lock to find the empty password. Only with this special data can empty password be found. This special data is not recommended to be changed.

Key 1-Key 8: This data is the Hash value (HASH) stored in each key channel. Each key has 4 groups at most, and each group has 8 bytes (8 Byte). There is a special calculation relationship between each group of data, and only one group of values changes when the key data is inserted and pulled out.

Note: We can use this feature to determine whether the key works normally and whether the EIS jumps.

Used/disabled: indicates the use status of the corresponding key channel. Note: valid only when EIS is activated.

Used: When selected-the channel has a valid key

Disabled: When selected, it means that the key of the channel has been disabled and the key can be enabled.

3.2.6 lock status

Figure 3.2.6 EIS lock status

Initialized: Check to indicate that the lock has been completely initialized.

TP cleared: tick to indicate that the TP flag has been cleared. If this position is not selected, it indicates that the lock enters the transmission protection mode, and it can be exited only by "clearing TP protection". Otherwise, it cannot be written when writing EIS data.

Personalized: Check to indicate that the lock has contained complete data and can enter the working state.

Activated: tick to indicate that the lock has entered the full working state, and the data cannot be overwritten by any external operation at this time; When only the user

The flag is cleared when the Empty Lock operation is performed. Only when this mark is not ticked, the lock EIS data can be overwritten, and operations such as personalized ELV can be executed; When the user inserts the working key again, the lock cylinder will activate the flag again if the lock cylinder data is correct.

Note: We can use this feature to check whether the key and lock are normal.

3.3 lock (EIS) tool II, lock replacement steps

3.3.1 lock failure

Conditions that may require replacement of the lock:

1. lock failure, code hopping, unable to return to normal
2. All the lock keys are lost and the key password cannot be found.

3.3.2 Prepare a new lock

New locks to be prepared in advance (select a type of lock, and note that the interface definition of the new lock is consistent with that of the lock to be replaced):

1. Second-hand locks that have not been erased, with working keys (need to collect data, calculate the key password and erase the empty locks after erasing the password)

2. Second-hand locks that have been wiped empty

3. Brand new lock that has been wiped empty

3.3.3 Operating instructions

1. Preparations

- 1. Connect the equipment: connect the APPRO2 host to the computer with USB cable, and connect the infrared key, OBD cable and test platform (or DIY cable group) at the same time.
- 2.Connect the lock: insert the OBD wire into the old lock and connect the 12 V power supply
- 3.Open APPRO2 software
- 4. Confirm whether the version of the software is updated. If there is an update prompt, upgrade the software to the latest version.

2. Back up the old lock data

- **1.Click Model-Mercedes-Benz Key Tools-Lock (EIS) Tools menu**
- 2. Select the vehicle type. When the vehicle type cannot be identified automatically, please select the vehicle type manually.
- 3.Read the old lock data
- 4. Back up the old lock data: Click "Save lock data", it is recommended to save it in the specified folder, create a file directory with the frame number of the lock and name the lock data as EIS _ old. Bin.
- 5.Save the frame number to a text file

3. New lock

- 1.Disconnect the 12 V power supply
- 2.Replace the lock with a new one and connect the 12 V power supply

4. Find the key password of the new lock and erase the new lock.

Note: (This step is not required for the new lock that has been erased; if the key code and erasure code of the new lock are available, it is not required to find the key code and erasure code)

- **1. Open the Model-Mercedes-Benz-Mercedes-Benz Key Tools-Password Search Menu**
- 2. Select the vehicle type. When the vehicle type cannot be identified automatically, please select the vehicle type manually.
- 3.Select the data acquisition mode. Note: when there is no working key, select "all lost acquisition-all lost keys".
- 4. Collect data and pay attention to the prompt of the software. The acquisition process takes about 5-10 minutes. If the software prompts an error during the acquisition process, do not continue the acquisition; Please exit the acquisition process, check the USB cable, 12 V power supply, lock connection or key status, and then acquire data again.

- 5.Find and save the key code. Please confirm that the computer can access the Internet, and the AP software will upload the data file collected just now to the server to find the key password. The search process takes approximately 0-5 minutes. The password is successfully found. Save the password to a text file for later use. If the search fails, please collect the data again and search for the key password again.
- 6.After finding the key code, save the key code
- **7. Open the key tool-Benz-Benz lock menu**
- 8.Read lock data
- 9.Paste the key code into the "Key Code" box
- 10. Click Get on the right side of the "Erase Password" box to get the erase password. The process of obtaining the erasure password takes about 10-30 seconds. If the wipe search fails, obtain the wipe password through other software or contact technical support to obtain the wipe password. If there is no such erasure password, the lock cannot be erased and the next operation cannot be performed.
- **11.Select "IR" communication method**
- 12.Click "Erase lock IR", pay attention to whether the key password and erase password are correct, insert the infrared key into the lock according to the software prompt, and wait for the software to return successfully. Pull out the infrared key from the lock after successful return

- **13.Select "OBD" communication mode**
- **14.Click "Read lock data" to check the parameter status: "Initialized" and "TP cleared" are selected, and "Activated" is not selected.**
- **15.If the "TP cleared" item is not selected, execute the "Clear TP protection" button once.**

5. Restore the old lock data to the new lock

- **1.Select "OBD" communication mode**
- 2.Copy the frame number backed up in step 2 to the "Frame number" input box and click "Write"
- **3. Select "IR" communication mode**
- 4.Click "Load lock data" and load the old lock data backed up in step 2
- 5. A group of 8-byte (16-character range is 0-9, A-F) key codes are randomly generated manually: 1011121314151617 and record (important)
- 6.Copy the generated key code to the "Key Code" input box
- 7. Click "Write lock data IR" and pay attention to whether the key password is consistent with that generated by yourself. The process of writing lock data takes about 1 minute.

6. Generate key data

- **1. Click Key Tools-Benz-Benz Key Data Generation Menu**
- 2. Load the lock data file backed up in the second step and paste the key password generated in the fourth step to the "key password" input box
- 3.Select V51 as the key file format
- 4.Generate a key file and save it. The key file generation process takes approximately 10-30 seconds.

7. Write a blank key

- 1. Open the key tool-Mercedes-Benz-Mercedes-Benz key reading and writing menu 2. Put the blank key into the infrared programming seat and click the "Identify the key" menu
- 2.Observe whether the "version" is the writable key type supported by the device, otherwise the device does not support the writing operation of the key. Check if Status is blank
- 3. Empty the key and identify the blank key again
- 4. load that key data file obtained in the fifth step, selecte a key data file in a blank position, and checking whether the key password is consistent with the password generated in the fourth step;
- 5.Write the blank position key data file to the blank key
- 6.If the write operation is successful, observe whether the "status" is "used".

8. Synchronize and test the new lock and new key

- 1. Click the key tool-Benz-Benz lock menu
- 2.Read the lock data and check whether the key position 5 just written has been used.

- 3.Click to detect the lock/key status. When a new key is inserted, the lock is automatically synchronized with the new key.

- 4.Slowly turn the key every 2-10 seconds in the sequence of 1st gear-2nd gear-ignition gear-2nd gear-1st gear, and repeatedly observe whether the vehicle status/15 (ignition) bar is flashing. If it is flashing, it indicates that the lock is replaced successfully.

3.4 Key code search (online)

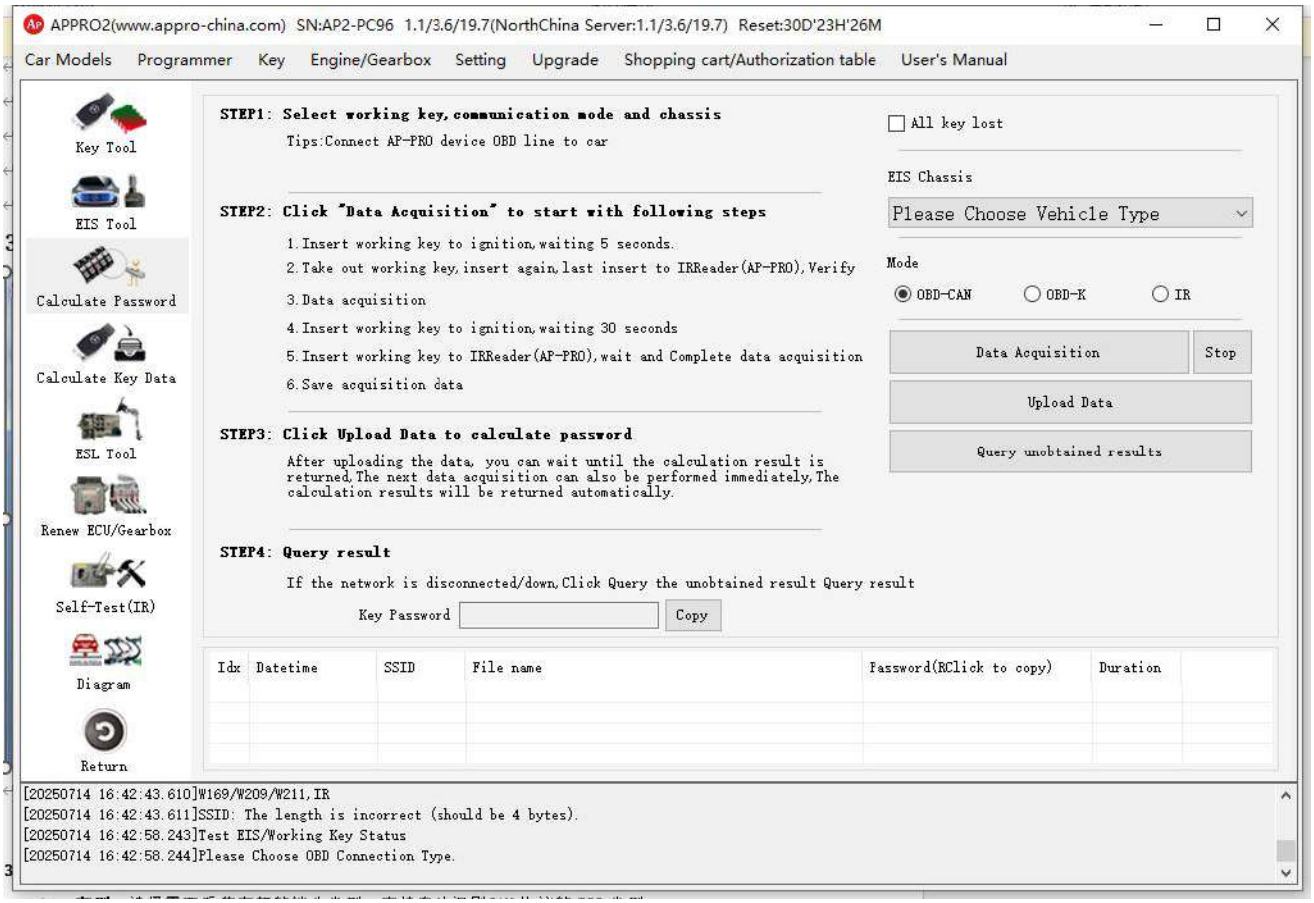


Fig. 3.3 Interface for Adding Collection of Key

3.4.1 Add collection and operation instructions

- **Vehicle model:** select the lock type of the vehicle to be collected, and support automatic identification of EIS type of CAN protocol;
- **Communication method:** the communication method used when reading EIS data. If the lock of the CAN protocol is preferred to use OBD communication, in other cases, please use the IR mode to read the lock data, for example, when the K wire lock or OBD cannot communicate normally;
- **Data acquisition mode:** when it is not selected by default, add acquisition mode is used. When all keys are lost, select the all-lost acquisition mode.
- **Collect data:** start the process of collecting data
- **Password search:** upload the collected data to the APPRO server to calculate the key password (Note: it takes 1-15 minutes to search the password. With the optimization and upgrade of the server, the success rate and speed of the search will be improved)
- **Query the result not obtained:** query the result calculated by the server last time (if there is a result last time) (Note: when the customer uses "Close temporarily and continue to search", the current function can be used to query the server calculation progress)
- **Temporarily close and continue searching:** After uploading the collected data to the server, you can close the waiting result channel and let the server complete automatically. The user can continue to collect the next data for uploading to the server to calculate the password.

(Note: after the user uploads the data, if it is found that the server needs to queue up to calculate the data or the waiting time is too long, the user can close the connection to the server and let the server automatically complete the calculation to avoid waiting for a long time, and the next data collection can be carried out.)

- **Key Password Copy:** Copy the calculated password to the pasteboard.

3.4.2 Support the addition of lock type for acquisition

W164	W172,204,207,212 (old, with direction lock)	W230 (K)
W164 2009-	W203, 463, 639 (K)	W216
W166, 197, 212, 218, 246	W202, 208, 210 (K)	W221
W169, 209, 211	W215, 220 (K)	W639 2009-

Note: 1. Vehicles supporting automatic identification of CAN communication in OBD mode.

2. Support the addition of the key for collecting and calculating the key password in the version of the working key, not the lock.

3. The key collected is required to be the ignition key of the original ordinary NEC key or BGA key or other keys that cannot read the key password.

3.4.3 Support the addition of key types for collection

①NEC original key (including intelligent and non-intelligent)

Note: The NEC-51 version is difficult to collect successfully, so it is not recommended to collect the data of this type of key!

②, BGA original key (including intelligent and non-intelligent)

3.4.4 Add key data acquisition steps

1.Insert the ignition key into the lock, wait for 5 seconds and then pull it out;

2.Insert the ignition key into the lock again, wait for 5 seconds, and then pull out the IMMO key programming seat verification key.

3. data acquisition proces;

4. Insert the ignition key into the lock again, and the ignition key will automatically synchronize the lock within 30 seconds;

5.Insert the ignition key into the key programming seat to complete the data acquisition and save the data.

Collection time: according to different types of keys, the collection time is generally 1-15 minutes.

BGA key 5-8 minutes.

NEC key 7-13 minutes.

Note: Most of other subsidiary keys (such as BE key) can directly read out their key EEPROM data and key password.

3.5 All keys lost acquisition

3.5.1 Type of lock supporting all-lost acquisition

W166, 197, 212, 218, 246	W172,204,207,212 (old, with direction lock)
W164 2009-	W216，221 2009-
W164，251	W221 -2009
W169,209,211	W906
W639 2009-	W220, 215, etc. K line lock

Note: All-out acquisition supports locking of most FBS1-FBS3 systems.

3.5.2. Both the IR adapter and the OBD cable are required

1.Connect the OBD cable to the vehicle and read the EIS data

2. Insert the infrared adapter into the lock according to the software prompt, and start to collect data

3. Wait for the acquisition to be completed and save the data.

Note: Full loss acquisition must be acquired on the platform, the 12 V power supply must be plugged into the power socket of the host, and the platform harness is not plugged into the power supply!

Do not directly collect the W246 lock on the vehicle, or it will be damaged!

3.5.3 Acquisition time

According to the different types of locks, the time required for each data acquisition varies, and the fast acquisition method is recommended to greatly shorten the acquisition time.

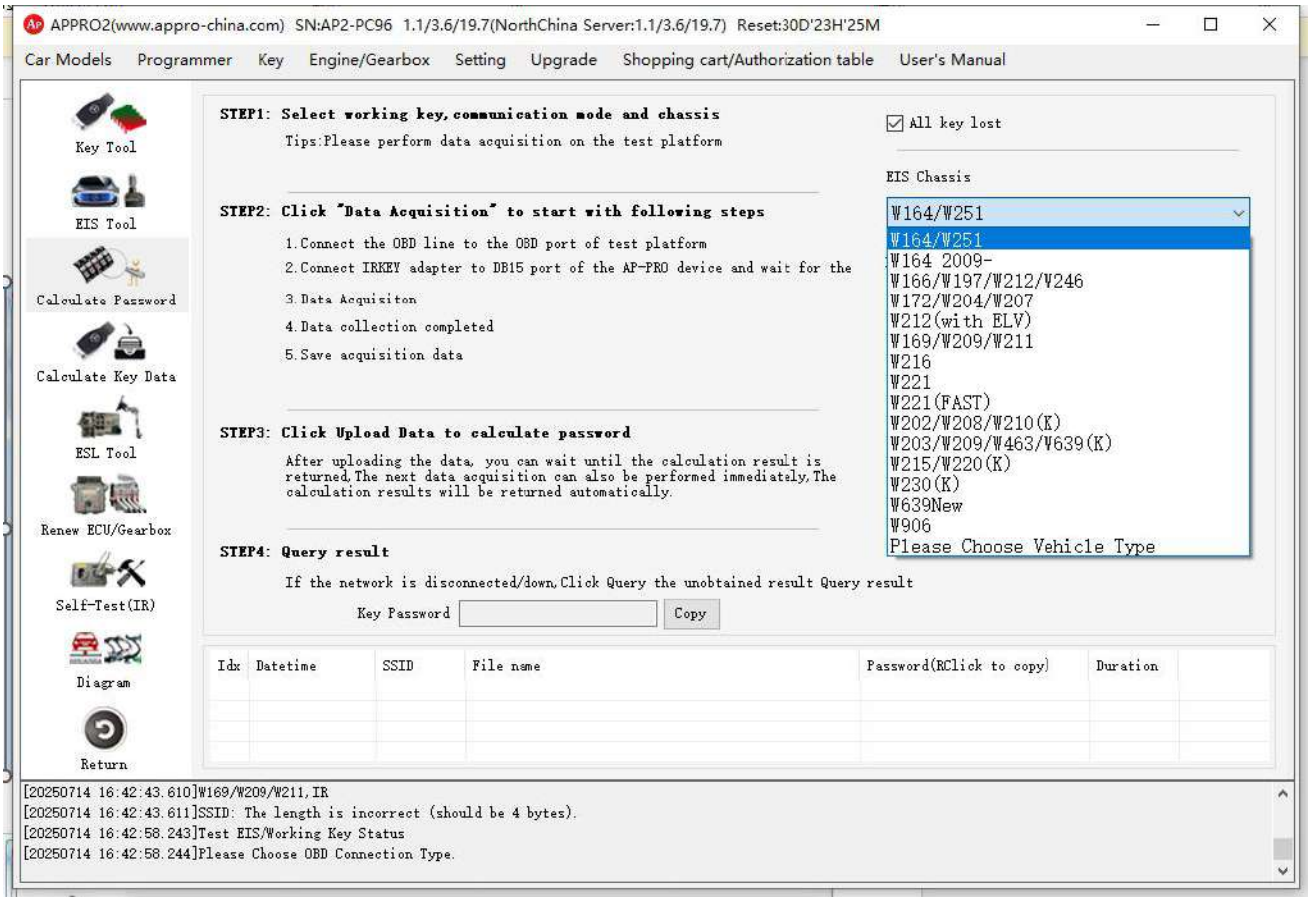


Figure 3.5.3.1 Model of lock supported by collection of all lost keys

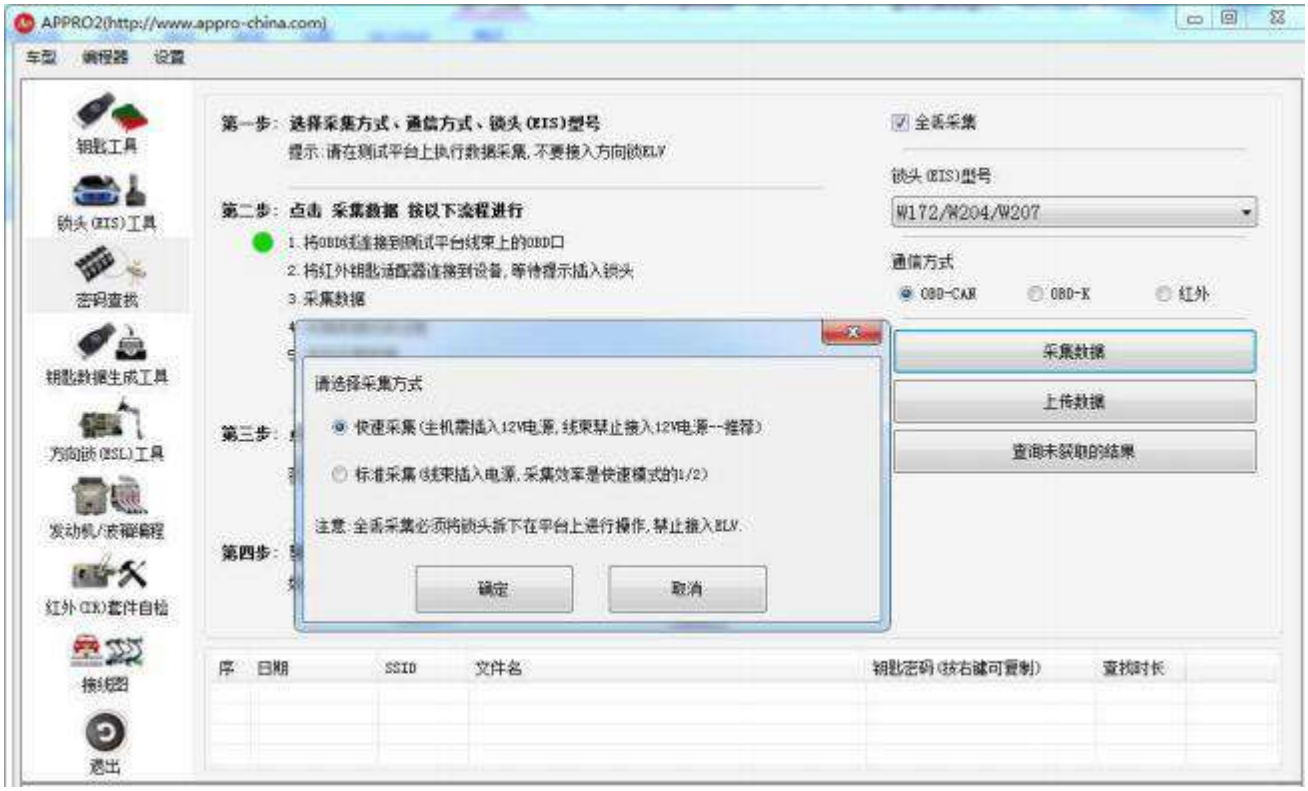

APPRO2(http://www.appro-china.com)
车型
编程器
设置
钥匙工具
锁头(EIS)工具
密码查找
钥匙数据生成工具
方向锁(ESL)工具
发动机/波箱编程
红外(IR)套件自检
接线图
退出
第一步：选择采集方式、通信方式、锁头(EIS)型号
提示：请在测试平台上执行数据采集，不要接入方向锁ELV
第二步：点击 采集数据 按以下流程进行
1.将OBDII线连接到测试平台线束上的OBD口
2.将红外钥匙适配器连接到设备，等待提示插入锁头
3.采集数据
第三步：
第四步：
全选采集
锁头(EIS)型号
W172/W204/W207
通信方式
OBD-CAN
OBD-K
红外
采集数据
上传数据
查询未获取的结果
请选择采集方式
快速采集(主机需插入12V电源，线束禁止接入12V电源--推荐)
标准采集(线束插入电源，采集效率是快速模式的1/2)
注意：全选采集必须将锁头拆下在平台上进行操作，禁止接入ELV.
确定
取消
序
日期
SSID
文件名
钥匙密码(鼠右键可复制)
查找时长

Figure 3.3.3.2 Collection of W207 lock key loss

Note: As the acquisition process of some locks is too long, the acquisition needs to be carried out on the test platform. It is recommended to select the "fast acquisition" mode for the following models: W172, W204, W207 (no need to connect to ELV).

Note: All locks with direction locks shall not be connected to the direction locks for acquisition when the acquisition is completely lost!

3.6 Key data generation tool (GENERATE KEY TOOL)

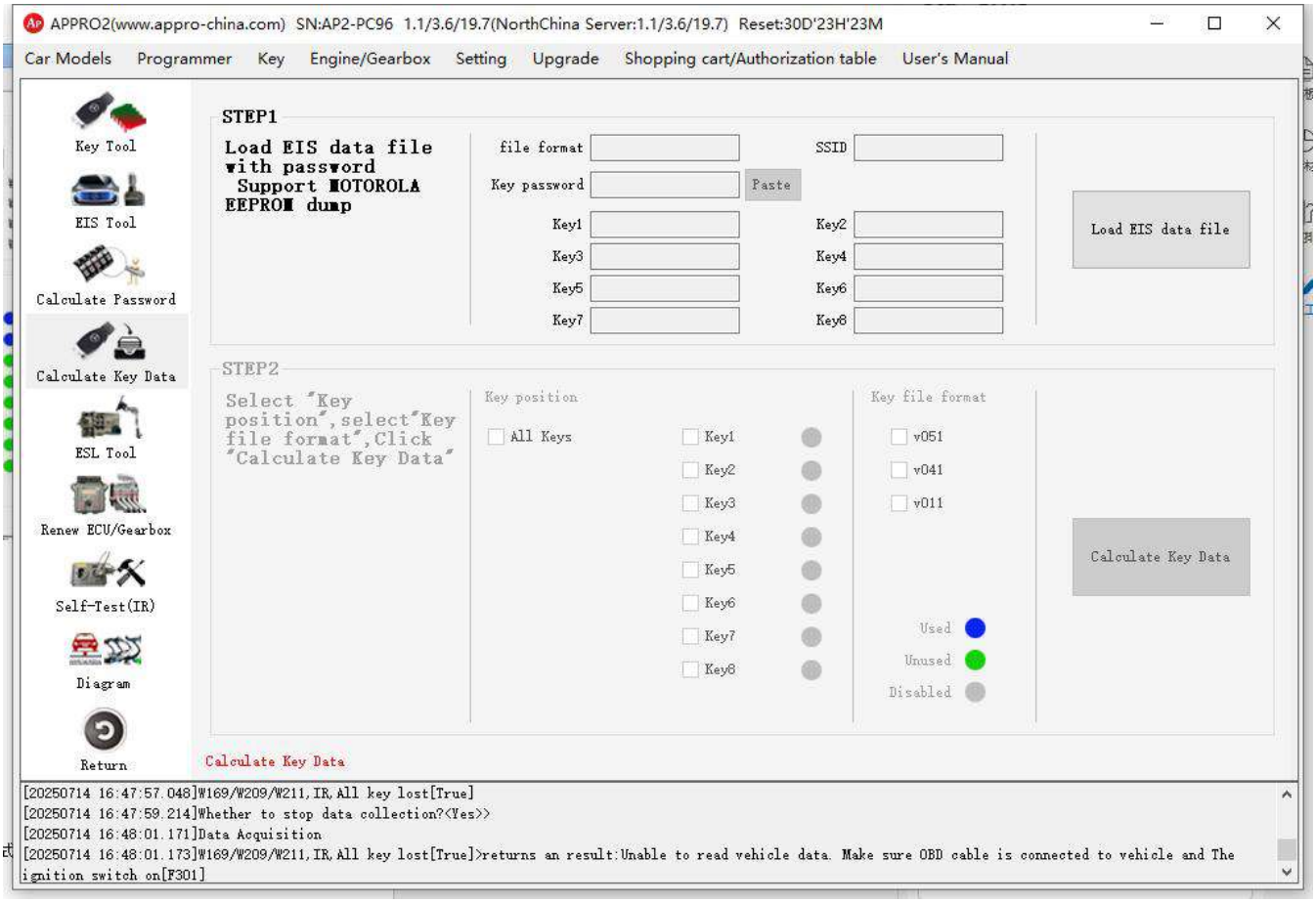


Figure 3.5 Generate Key File

3.6.1 Supported Data Formats

- EEPROM files for all Motorola CPU locks
- Support APPOMB format-data with OBD/IR reading
- HC05 format

3.6.2 Generate key file

Generate a key file (online) ready to write a new key based on the EIS data of the key containing the key code

- **Step 1: Load EIS data with password**

  The loaded file type is automatically determined, and APPROMB format, HC05 format and old Motorola EEPROM files are supported. Explanation of the three colors displayed after the file is loaded: blue, indicating that the location is used; green, indicating that the location is not used; Gray to indicate that the location is disabled.

- **Step 2: Generate the key file**

  Click "Generate key file" to calculate and generate key file online.

Note: APPRO2 supports the generation of key files in two formats: v051 and v041. However, when using the key file programming, only the v051 file is supported for key programming. That is, when using APPRO2 for key programming, no matter whether the key is a smart key or not, the v051 file is used!

4. IMMO matching steps of Benz key

- **Step 1: Obtain the key code (key)**

  The key code can be obtained in a number of ways:

  1. Motorola's CPU (most pre-09 lock EIS) is read directly using the programmer.

  2. Read directly from the lock EIS by means of infrared IR (old Motorola HC05 series or HC08 series K-line lock).

  3.Read directly through the key, such as NEC key, BE/EB subsidiary key, etc.

  4. Use the data acquisition method to calculate the password online.

- **Step 2: Read EIS data**

  1.Obtain EIS data by direct OBD.

  2.EEPROM data of lock EIS read by programmer

  3.Read EIS data in IR mode (not all locks support it)

  Note: After reading the EIS data, be sure to save the obtained key code into the EIS data (key).

- **Step 3: Generate key data**

  1.Use the data of lock EIS (including key password) to upload the file of online calculation to generate the programming key.

- **Step 4: Program the key**

  1.Program a blank key using the generated key file.

  Note: At present, APPRO supports the programming of NEC keys and BE/EB subsidiary keys. Support for other keys will be added in the future.

5. Several key terms of Mercedes-Benz IMMO system

- **Key code:** key data for EIS authentication of Benz key and lock, 8 bytes in total.
- **Erase password:** key data used when second-hand accessories are erased into new accessories, and key password is also required for inserting IMMO components such as empty locks.
- **Special key:** key data used in calculating the erasure code.
- ESL/ELV steering lock: The electro-mechanical lock on the steering column of Mercedes-Benz. This module is prone to problems and can be replaced.
- **BE key:** currently, it is a relatively stable auxiliary key to replace the original key (NEC or BGA), and the key version is BE.
- **NEC key:** the CPU of the original key is NEC's CPU, which can be used repeatedly. Most versions are v51 or v57.
- **BGA key:** The original key, whose CPU is packaged in BGA, can only be written brand new at present, and can not be erased temporarily. Version is v62.

6. Direction lock (ESL) tool, Mercedes-Benz direction lock ELV replacement steps

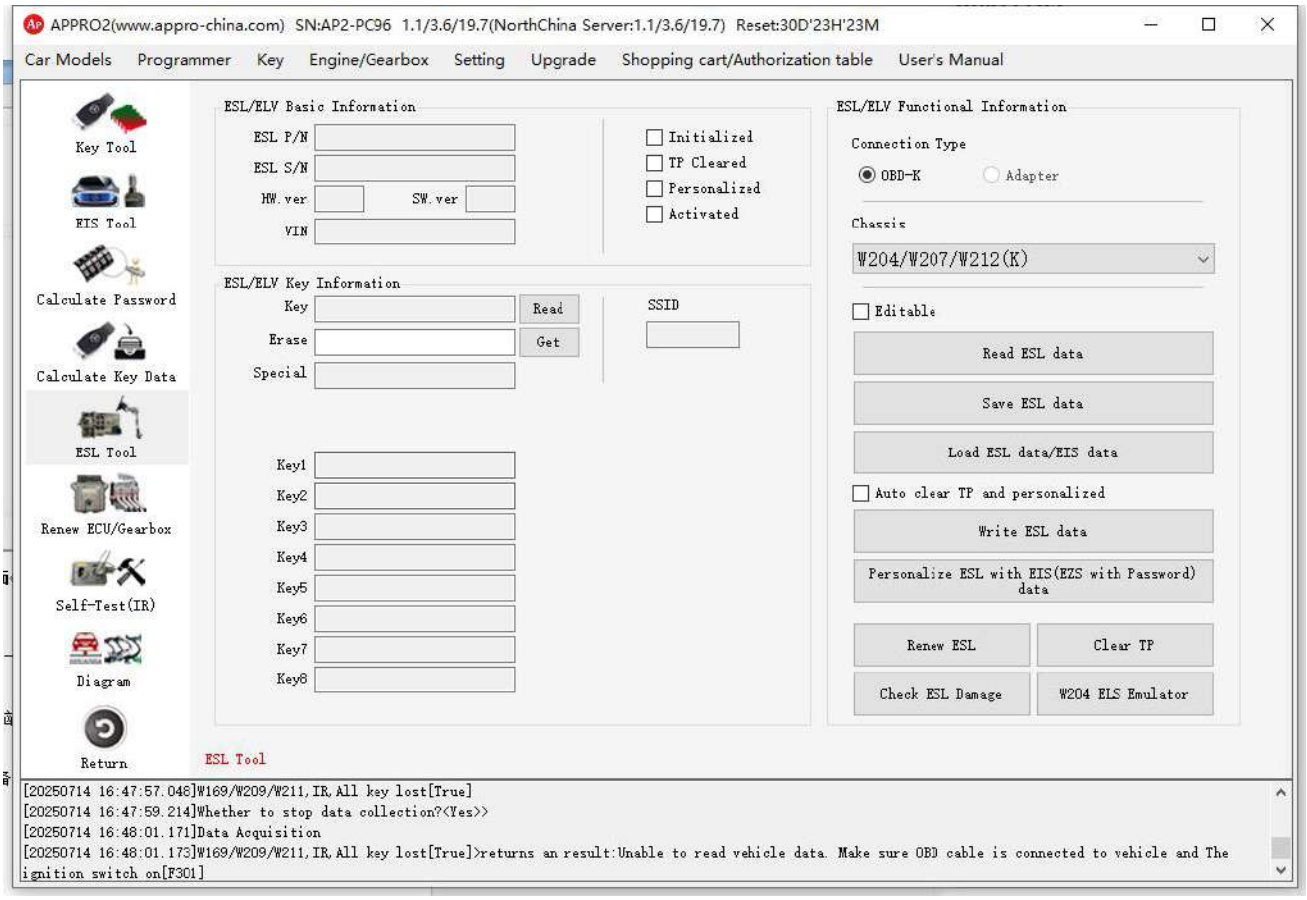


Figure 6 Direction lock ELV interface

6.1 Preparations

- 1.Connection equipment (optional workbench mode or one of the direct vehicle OBD modes) workbench:

A. Connect the equipment: connect the APPRO2 host to the computer with USB cable, and connect the infrared key, OBD cable and test platform (or DIY cable group).

B. Connect the lock: insert the OBD cable into the lock (cable group), and prepare the original vehicle key for standby.

C. Prepare the new direction lock

D. Remove the old direction lock and replace it with a new one.

E. Direct vehicle OBD with 12V power supply connected:

This method is not supported.

2. Open the AP software on the computer

- 3. Confirm whether the version of the software is updated. If there is an update prompt, upgrade the software to the latest version.

6.2 Operating instructions (for details, it is recommended to read APPRO2 Mercedes-Benz Direction Lock Replacement Tutorial.PDF)

6.2.1 Obtain the key code

- **1. Open the Model-Mercedes-Benz-Mercedes-Benz Key Tools-Password Search menu to obtain and save the key password.**

6.2.2 Backup lock data

- **1.Open the Model-Mercedes-Benz Key Tools-EIS Tools menu**
- 2.Confirm that the original vehicle key cannot be inserted into the lock.
- 3.Read the lock data
- 4.Paste the key code into the "Key Code" box and save the lock data
- 5.Save the frame number and key password to the text file.

6.2.3 Obtain the lock erasing password

- 1. Click Get on the right side of the "Erase Password (Infrared)" box to get the erase password. The process of obtaining the erasure password takes about 10-30 seconds. If the wipe search fails, obtain the wipe password through other software or contact technical support to obtain the wipe password. If there is no such erasure password, the lock cannot be erased and the next operation cannot be performed.

6.2.4 Empty lock

- **1. Select "IR" communication mode**
- 2. Click "Empty lock (infrared)", pay attention to whether the key password and erase password are correct, insert the infrared key into the lock according to the software prompt, and wait for the software to return successfully. Pull out the infrared key from the lock after successful return
- **3.Select "OBD" communication mode**
- **4. Click "Read lock data" and check the parameter status: "Initialized" and "TP cleared" are selected, "Activated" and "Not selected".**
- **5.If the "TP cleared" item is not selected, execute the "Clear TP protection" button once.**

6.2.5 Recover lock data

- 1.Copy the frame number backed up in step 3 to the Frame Number box and click Write
- **2. Click "Load EIS/Motorola data EEPROM data" to load the backup EIS file data in step 3**
- **3.Select the "infrared" communication mode**
- 4. Click "Write lock data (infrared)" and pay attention to whether the key password is correct. The process of writing lock data takes about 1 minute.
- 5.Select "OBD" communication mode, click "Read lock data" and check whether the data is abnormal.

6.2.6 Empty direction lock

- **1.Open the Model-Mercedes-Benz Key Tools-Direction Lock (ESL) Tools menu**
- 2. Select the vehicle model
- **3.Click "Read direction lock data"**
- 4. Click the "Get" button on the right of the "Erase Password" box to get the direction lock erase password. If the wipe search fails, obtain the wipe password through other software or contact technical support to obtain the wipe password. If there is no such erasure password, the direction lock cannot be erased and the next operation cannot be performed.
- **5. Click the "ESL" button and pay attention to whether the erasure password is correct.**
- 6.Pull out the infrared key
- **7. Click "Read direction lock (ESL) data" again to check the parameter status: "Initialized" and "TP cleared" are selected, while "Personalized" and "Activated" are not selected.**

- **8. If the "TP cleared" item is not selected, execute the "Clear TP protection" button**

6.2.7 Synchronizing lock and direction lock

- **1.Open the Model-Mercedes-Benz Key Tools - EIS Tools menu**
- 2.Read the lock data
- **3.Click "Synchronizing lock EIS data to direction lock ELV" "".**
- **4. Open the menu of Model-Mercedes-Benz-Mercedes-Benz Key Tool-Direction Lock (ESL Tool) and select the model.**
- **5.Click "Read direction lock data"**
- 6.Check whether the "Personalized" item is selected, and check whether the lock data has been written

6.2.8 Use the original vehicle key to activate the lock

- 1.Insert the original vehicle key into the lock, and confirm whether the key works normally through the following points: whether the switch can be turned on, and whether the unlocking sound of the direction lock (ESL) can be heard. If the normal replacement is successful, the "activated" sign of the direction lock and the lock has been set. If the key is not in normal working condition, there are two situations:

  A. The "activated" item of the lock is set, and the "activated" item of the direction lock is not set: the synchronization of the lock and the direction lock is not successful, and it needs to be repeated, otherwise, check whether the direction lock is damaged.

  B. The "activated" item of the lock and the "activated" item of the direction lock are not set: the key is incorrect. Prompt: the software can be used to check the working state of the lock.

- **2.Open the Model-Mercedes-Benz Key Tools-Lock (EIS) Tools menu**
- **3.Click "Read lock data"**
- 4. Click "Detect lock/key status" and insert the key, wait for 5-10 seconds
- 5. Slowly turn the original vehicle key: 1st gear-2nd gear-ignition gear-2nd gear-1st gear, turn one gear every 2-5 seconds, and repeat this operation for many times. Observe whether the column of "vehicle status"/ "15 ignition" flashes on the workbench. If it flashes, it indicates that the direction lock is replaced successfully. Connect the vehicle back and observe whether the vehicle can be started successfully. If it can be started, it indicates that the direction lock is replaced successfully.

7. Steps to disable the key of Mercedes-Benz

➢ Step 1: Identify the lock type

1. Connect the APPRO2 host to the computer with USB cable, connect the infrared key and OBD cable at the same time, connect the OBD cable to the car, open the model-Benz-Benz key tool-lock (EIS) tool menu, select the model and then select OBD or IR mode to read the lock data.

Fig. 7.1 Locking state

➢ Step 2: Read all key bits

Select "Read lock data" as shown in Figure 7.1, click "Disable key", and insert the original vehicle key into the lock according to the prompt. Confirm that the vehicle battery voltage is sufficient, such as 12 V power supply for platform operation.

➢ Step 3: Disable a key bit

1. Select the key position to be disabled, and then click "Disable Key"

2. Return to the main interface again to read the lock data, and you can see that the key bit has been disabled.

Figure 7.2 Select Disable "Key 3"

Figure 7.3 Disable "Key 3" successfully

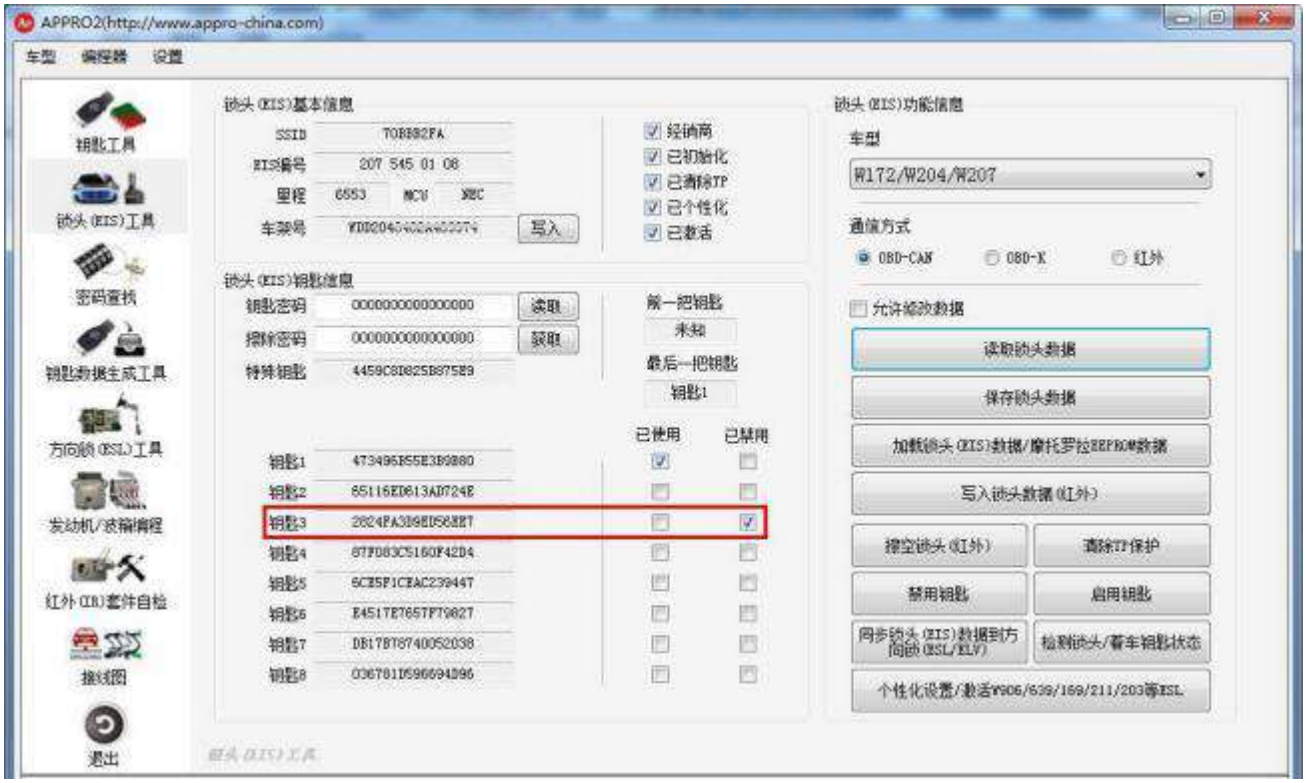


Fig. 7.4 Status after lock disabling key 3

8. Steps for starting the key of Benz

➢ Step 1: Identify the lock type

1. Connect the APPRO2 host to the computer with USB cable, connect the infrared key and OBD cable at the same time, connect the OBD cable to the car, open the model-Benz-Benz key tool-lock (EIS) tool menu, select the model and then select OBD or IR mode to read the lock data.

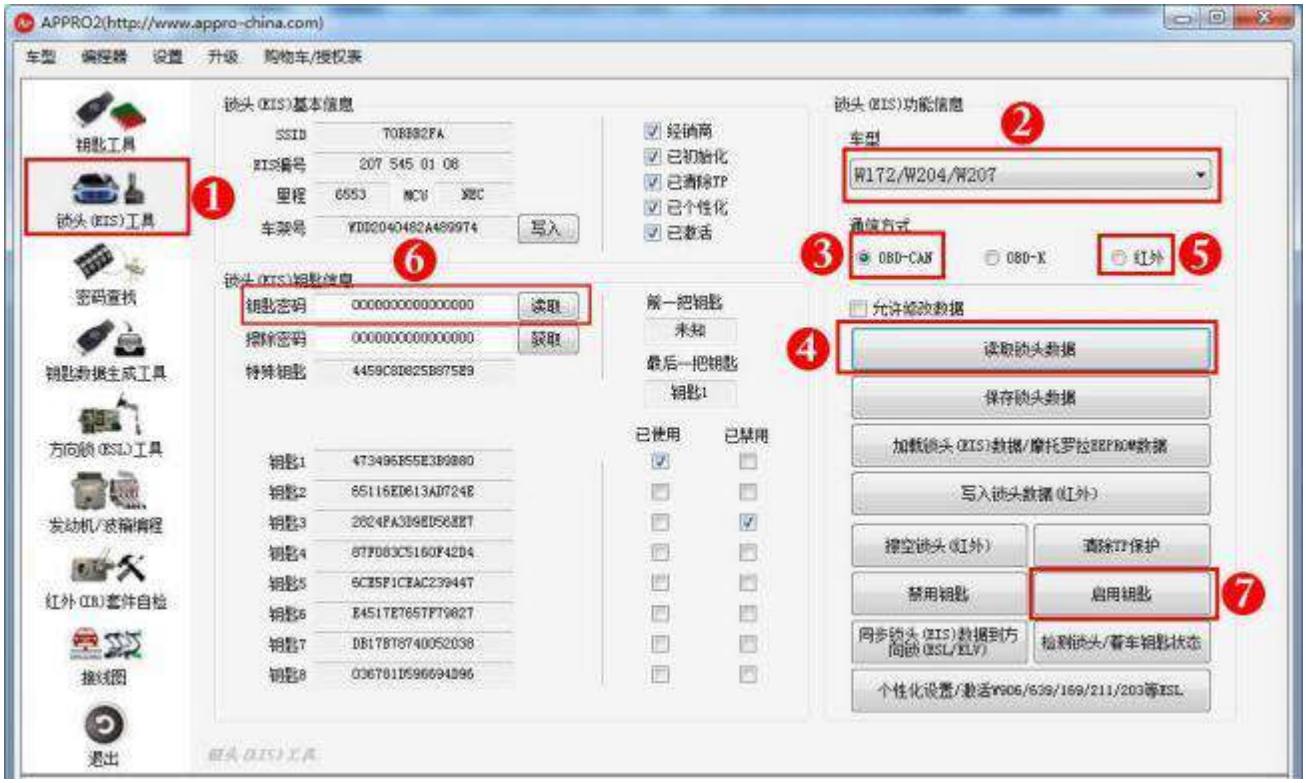


Figure 8.1 Steps for reading the lock status and enabling the key

➢ Step 2: Calculate the key code

1. The key password can be obtained in multiple ways (note: for details, refer to the steps of adding acquisition or losing acquisition):

A. Motorola's CPU (most pre-09 lockhead EIS) is read directly using the programmer.

B. Read directly from the lock EIS by means of infrared IR (old HC05 or HC08 K-line lock)

C. Direct reading by key, such as NEC key, BE/EB subsidiary key, etc.

And D, calculate that password on line by using a data acquisition method.

➢ Step 3: Calculate the enable password

1.Select "Enable Key" to enter the software interface for enabling the key

2. First paste the "Key Password" and click "Get" to enable the password for online calculation. This step must keep the network normal.

3.Wait for the server to calculate the successful enable password.

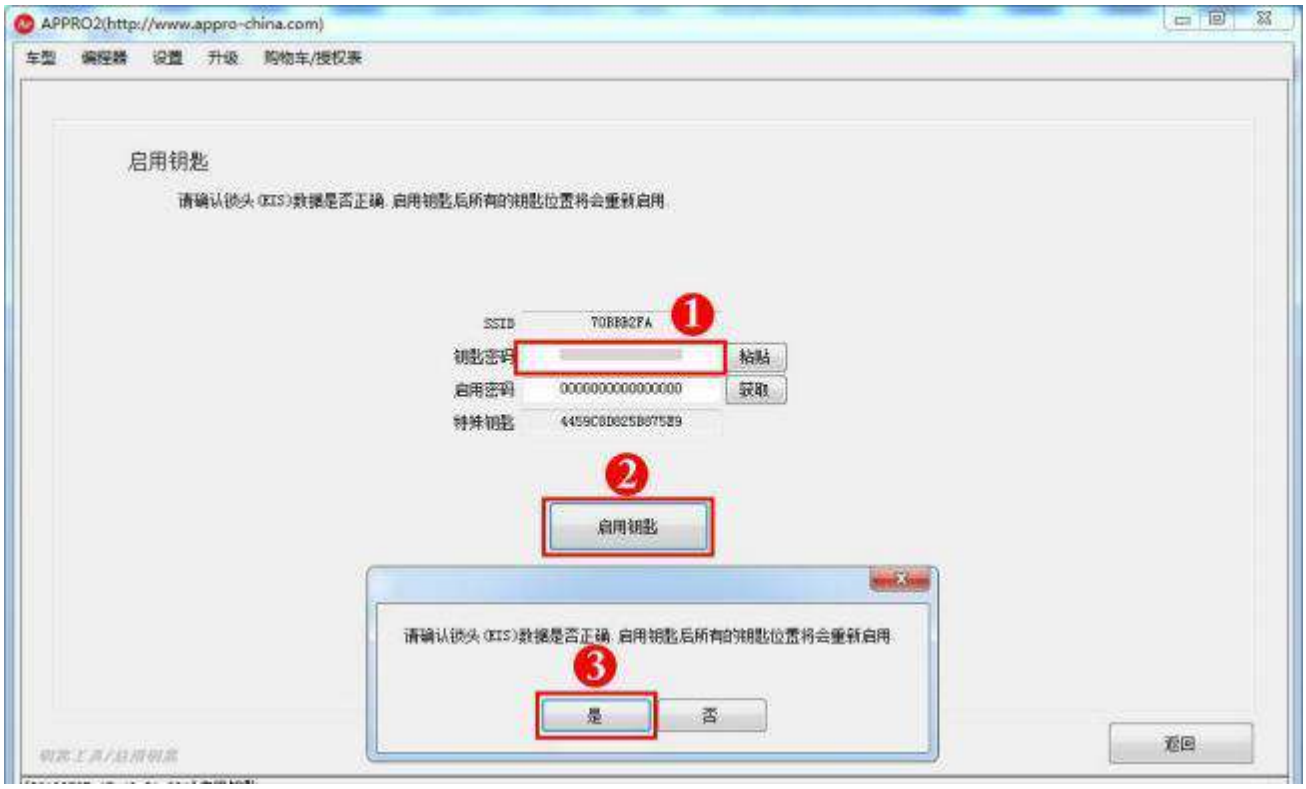


Figure 8.2 Process of calculating the Enable Password

- **Step 4: Enable all key bits**

  Click "Enable key" and insert the infrared key adapter into the lock according to the prompt, and then wait for success.

9. Steps for repairing code hopping (omitted..)

10. Steps for writing keys in Mercedes-Benz IR

10.1 Preparations

- 1.Check whether the power supply of the vehicle is sufficient. If the power supply is insufficient, it can be connected to the external power supply.
- 2. Connect the APPRO2 host to the computer with USB cable, and connect the infrared key, OBD cable, test platform (or DIY cable group) (this example does not need to use the infrared key)
- 3.Connect the lock: connect the lock platform cable with the OBD cable and connect the 12V power supply.
- 4. Open the AP software on the computer

- 5. Confirm whether the version of the software is updated. If there is an update prompt, upgrade the software to the latest version.
- 6.Generate V51 format key data file:

  A. Obtain the lock key password

  B. Obtain the original lock data file

  C. Open the menu of "Model-Benz-Key-Benz Tool-Benz Key Data Generation" to generate V51 format data files with the data in steps a and B.

10.2 Operating instructions

10.2.1 Write the Benz BE key

- 1. Get the Mercedes BE key ready
- **2. Open the menu of "Model-Mercedes-Benz-Mercedes-Benz Key Tools-Key Tools"**
- 3.Select the key type
- **4.Click the "Identify Key" button**
- 5.Check whether the version bar displays: BE
- **6. Click the "Wipe" button**
- 7.Click the "Identify Key" button to check whether the status bar displays: 21DF and blank
- 8.Click "Load key file" to load the prepared key data file.
- 9.Check whether the password in the "key password" column is the same as the lock key password. If the two passwords are not the same, the generated key will not start the vehicle.
- 10.Click the "Write" button and wait for the successful write to return.
- 11.Click the "Identify Key" button and then click "Read BE Key Information" to check whether the "Key Position" is consistent with the key data file in the blank position, whether the "Status" is "Used", and whether the "Key Code" is the same as the lock key code.
- 12.Vehicle identification new key. Insert the new key into the lock. If the original key channel of the lock has a normally used key, it is necessary to wait for the new key to be identified by the lock (this process takes a long time, which may take 1-30 minutes). If the new key is generated from the unused key channel, the lock should be able to quickly identify the new key.
- 13. Try to ignite. If the vehicle is unable to catch fire, open the menu of "Model-Benz-Benz key tool-lock tool", click the button of "Detect lock/key state", and then repeatedly turn the key in the lock to test whether the new key works normally (when the column of "Vehicle state/ (15 ignition)" flashes, it indicates that the new key works normally).

10.2.2 Write Mercedes-Benz original fully intelligent key

- 1. Prepare a blank Mercedes-Benz full smart key. Note: The A03 NEC adapter is required to wipe the non-blank Mercedes-Benz full smart key to the blank state.
- **2. Open the menu of "Model-Mercedes-Benz-Mercedes-Benz Key Tools-Key Tools"**
- 3.Select the key type
- **4.Click the "Identify Key" button**
- 5.Check whether the version bar displays: original NEC smart key-Vxx, check whether the status bar displays: 21DF and blank (if the blank state is not displayed, please use the A03 NEC adapter to erase to the blank state, if the key is not in the blank state, you cannot continue to the next step)
- 6.Click "Load key file" to load the prepared key data file.
- 7.Check whether the password in the "Key Password" column is the same as the lock key password. If the two codes are different, the generated key will not be able to start the vehicle

- 8. Click the "Write" button and wait for the successful write to return.
- 9.Click the "Identify the key" button to check whether the "key position" is consistent with the key data file in the blank position, and check whether the "status" is "used".
- 10.Vehicle identification new key. Insert the new key into the lock. If the original key channel of the lock has a normally used key, it is necessary to wait for the new key to be identified by the lock (this process takes a long time, which may take 1-30 minutes). If the new key is generated from the unused key channel, the lock should be able to quickly identify the new key.
- 11. Try to ignite. If the vehicle is unable to catch fire, open the menu of "Model-Benz-Benz key tool-lock tool", click the button of "Detect lock/key state", and then repeatedly turn the key in the lock to test whether the new key works normally (when the column of "Vehicle state/ (15 ignition)" flashes, it indicates that the new key works normally).

10.2.3 Write Mercedes-Benz original semi-intelligent key

- 1. Prepare a blank Mercedes-Benz semi-smart key. Note: If the key is not a blank Mercedes-Benz semi-smart key, if there is no A04 NEC adapter, the semi-smart key cannot be erased to the blank state.
- **Open the "Model-Benz-Benz key tool-key tool" menu**
- 3.Select the key type
- **4.Click the "Identify Key" button**
- 5. Check whether the version bar displays: original NEC key-vxx, and check whether the status bar displays: 21DF and blank (if the blank state is not displayed, you can use the A04 NEC adapter to erase the blank state. If the key is not blank, you will not be able to continue to the next step)
- **Steps 6 and 7 refer to steps 6 and 7 of 10.2.2.**

10.2.4 Matching method of Mercedes-Benz semi-intelligent key and full-intelligent key:

- 1. Insert the smart key into the vehicle, and turn off the engine after the vehicle recognizes the key and starts once.
- 2. Use the intelligent start button to start for 5 minutes, turn off the engine and get off.
- 3. Wait for 5 minutes before getting on the bus and starting, and the intelligent matching is successful.

Note: The 08 version of the smart key can replace most of the other versions of the smart key 10 years ago, and the smart key 10 years later needs to match the corresponding version.

11. Steps of Mercedes-Benz Empty Empty Gear Module/Engine Module//Gear Box Module/

This function supports such operations as erasing the engine, gearbox and gear module, writing the frame number, and personalizing the settings.

11.1 Preparations

- **1.Connect the device**

  A. Connect the equipment: connect the APPRO2 host with the A01 programmer, and connect the computer with the USB cable.

  B. Remove the computer board from the vehicle, open the "Key Tool-Benz-Benz Wiring Diagram", select the corresponding computer board type, and connect the computer board to the A01 adapter according to the wiring diagram.

  C. Connect 12 V power supply

- 2. Confirm whether the version of the software is updated. If there is an update prompt, upgrade the software to the latest version.
- 3.As shown in the figure below

Fig. 11.1.1 Wiring Diagram of Benz

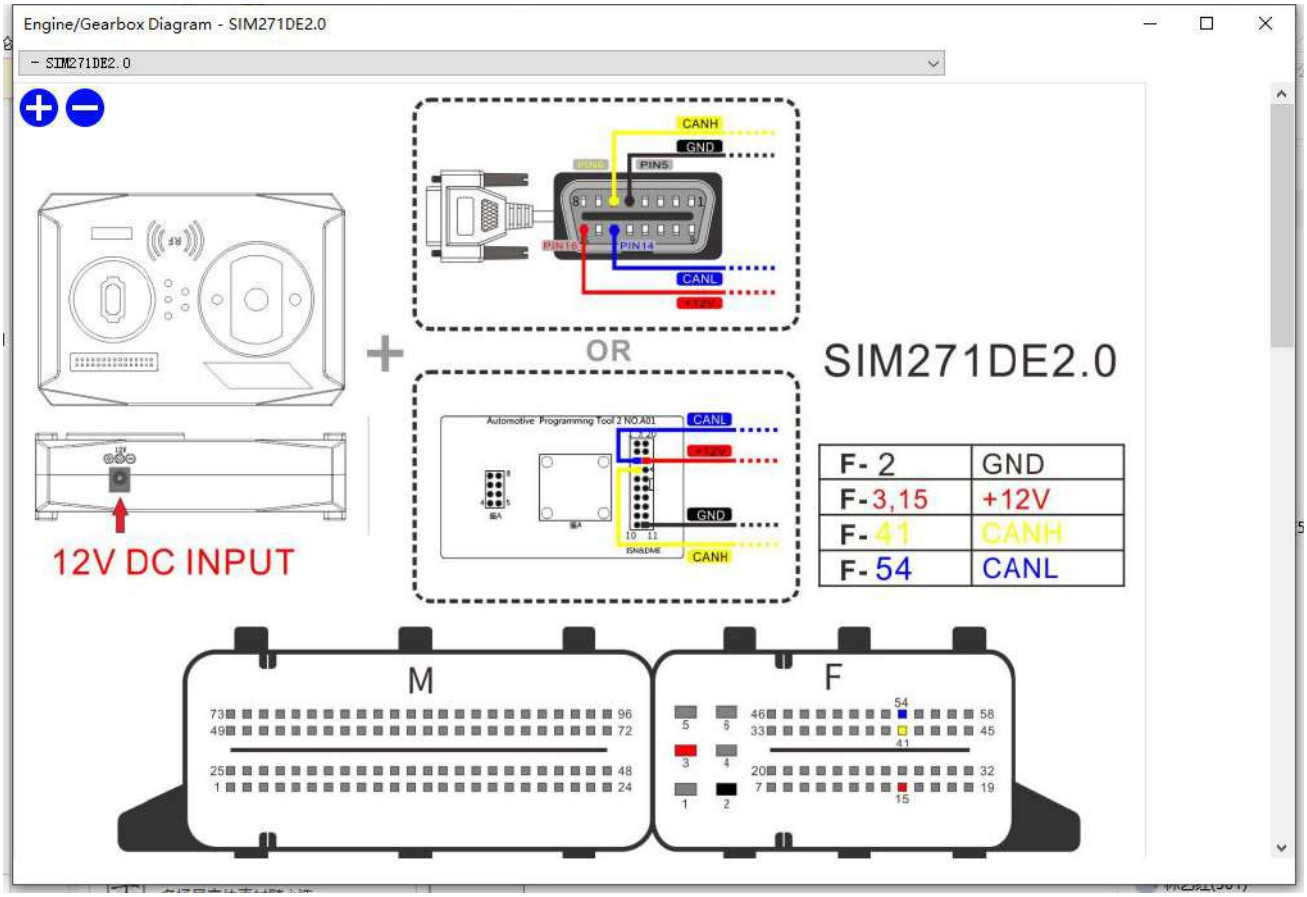


Figure 11.1.2 Mercedes-Benz ISM Wiring Diagram

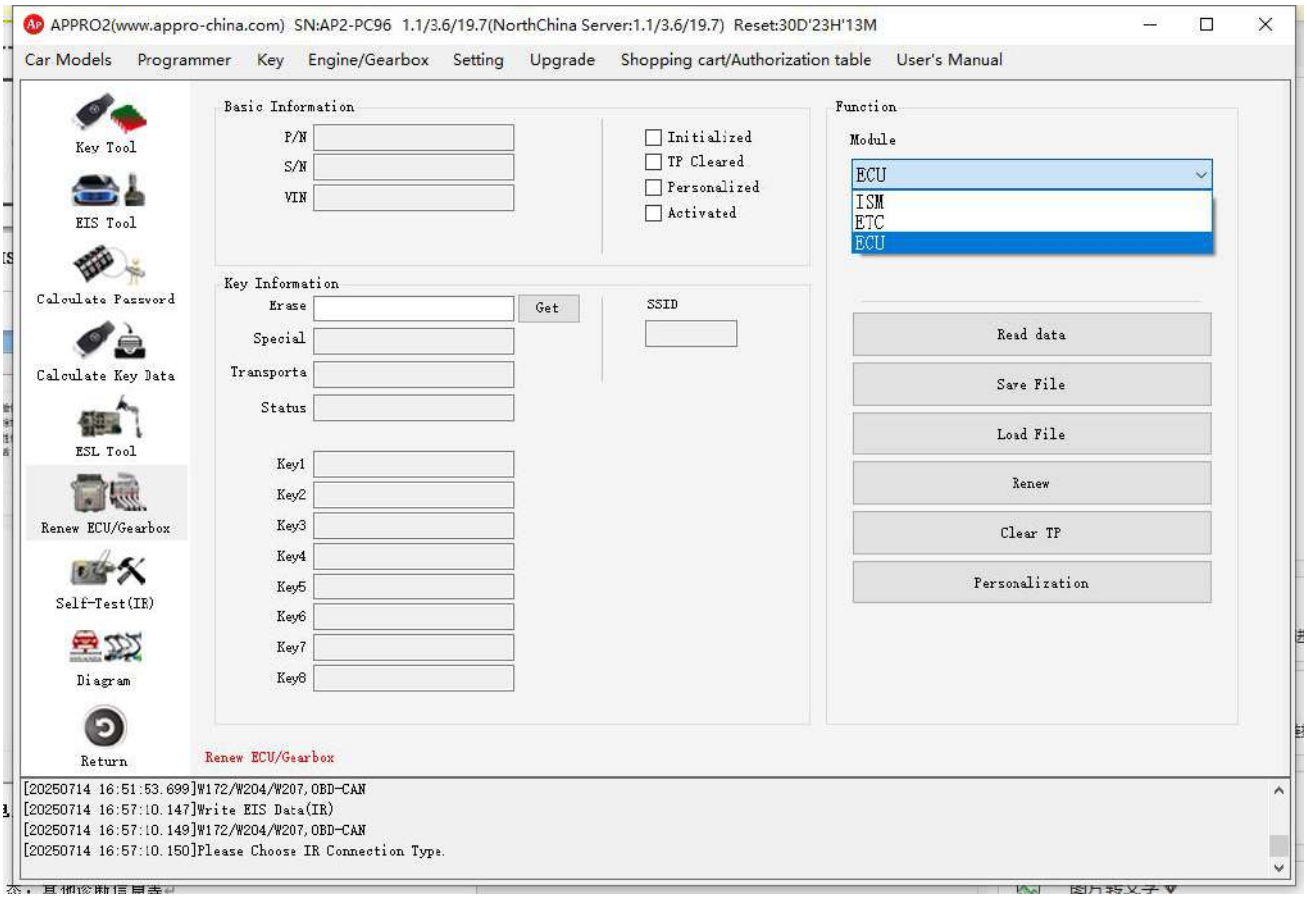


Figure 11.1.3 Supported PC Board Types

11.2 Function introduction

- 1.Read data: Read the key information, module status, other diagnostic information, etc. in the computer board.
- 3.Save data: Save the read data file
- 4.Load data: Load the read data file
- 5.Write the frame number: update the frame number in the computer board
- 6. Obtain the erasing password: After reading the module key information, obtain the erasing password online.
- 7. Empty the direction lock (ESL): Make the module become unused, which can be matched to other vehicles (Note: the module needs to be wired separately when it is empty)
- 8. Personalization: Exercise authorization to match the module to the vehicle (Note: the module needs to be installed back to the vehicle)
- 9.Clear TP: Clear TP protection

11.3 Module Status

1. Activated: Select Initialized, TP Cleared, Personalized, Activated

2.Personalized: Select Initialized (TP cleared, personalized status); Unchecked (activated state)

3.TP cleared: Select Initialized (TP cleared); Unselect (Personalized, activated)

4.Initialized: select the initialized status; Unchecked (TP cleared, Personalized, Activated status)

12. Infrared (IR) kit self-test

This function automatically detects the reading and writing of the Mercedes-Benz key and the infrared key adapter of the APPRO2 host to determine whether the hardware is normal.

Step: **Connect the device**

A. Connect the equipment: connect the APPRO2 host to the computer with USB cable.

B. Insert the infrared key adapter into the DB15 interface of the APPRO2 host and the special Jack of the Benz key respectively.

C. Carry out self-inspection according to the operation process shown in the figure below. If the prompt "IRKEY component works normally", the APPRO host and the infrared key adapter work normally. If there is an abnormal prompt, please contact the manufacturer's technical support.