# Passenger Car Drive Authorization Systems

Service Technology Guide

Mercedes-Benz

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Service Technology Guide

Daimler AG · Technical Information and Workshop Equipment (GSP/OI) · D-70546 Stuttgart

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# Contents

Dear Reader,

Since the introduction of the immobilizer as standard equipment on our vehicles at the beginning of 1994, we have continuously developed new and improved theft protection measures. Some workshops have become unaccustomed to some of the important details of our earlier systems.

Based on various feedback received from our service operations, we have discovered that the existing media, such as STAR DIAGNOSIS, WIS and the diagnosis manuals, are not sufficient to equip you, the service adviser or mechanic, to meet the challenge of working with older model series.

We have therefore enlisted the help of experts from the development department and logistics center to compile this guide, which contains information that will be useful in your work as a service advisor or mechanic. This does not replace the existing media, but links them together and supplements them.

This guide contains a comprehensive overview of all drive authorization systems to help you with your work on the various vehicles.

The guide starts with an overview of the installation periods and keys originally issued. This is followed by a series of descriptions of the individual systems including their features, functions, diagnosis information and procedures to follow in the event of a system defect or loss of a key. Due to their complexity, we have only provided a general description of the systems.

The guide is intended to be a practical document providing you with all the essentials necessary for quick and effective diagnosis during reception and in the workshop, and for successful repairs.

All information was correct as of the copy deadline in October 2008 and may therefore vary from more up-to-date sources.

We hope that this publication will be actively employed and will be able to contribute significantly to the success of your work.

Yours,

The Comfort and Safety Systems (Electrical Systems / Electronics) Product Technology Team
(GSP / TPT)

# Infrared light/transponder/codes

## Infrared light

Infrared light is used in access and drive authorization systems at the following points:

- Transfer of access authorization data from key to access system
- Transfer of drive authorization data from electronic key to EZS (applies to DAS 3)

## Transponder

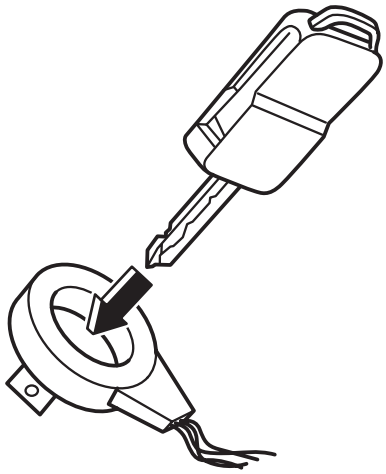
Transponders are used as a transmission medium in the DAS 2a, X and 2b drive authorization systems.

When the ignition is switched on, an induction coil in the ignition lock is supplied with power. The induction waves which are emitted are absorbed by the transponder coil in the key and supply power to the transponder in the key. Upon activation, the transponder in the key transmits the drive authorization code via the same coil as an induction wave. The code is received by the induction coil and forwarded to the DAS radio frequency control unit where it is verified.

## Codes

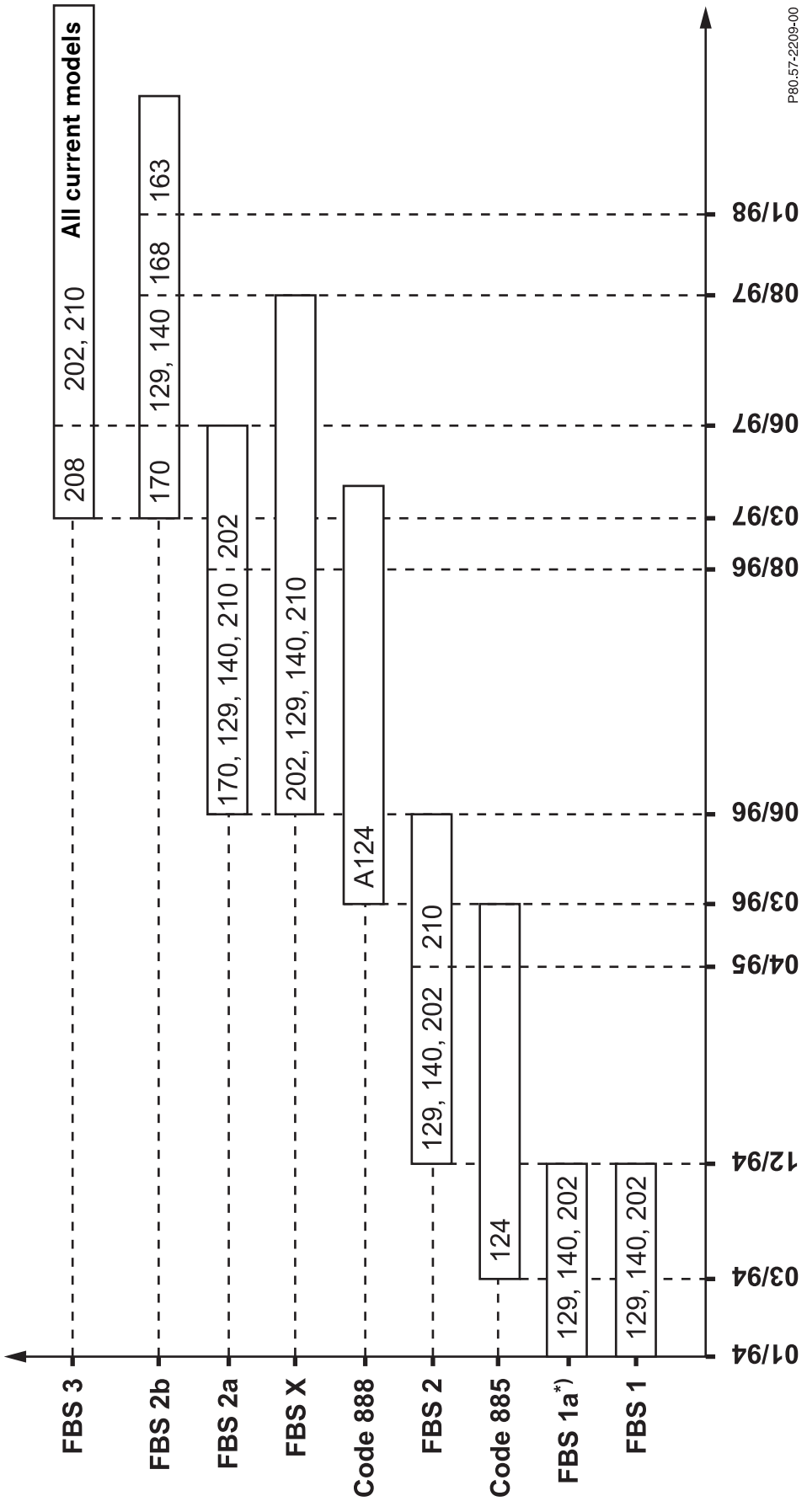
The term **code** is understood to refer to the encoded transmission of a message. The following codes are used in the **access and drive authorization systems**:

- In the case of a **variable code**, the key transmits its code to the receiver. After this has verified that the code is authorized, the system expects to receive a new variable code for the subsequent operation.
- The selective / global **access code** is contained in the access authorization data telegram. It is transmitted by the key.
- The **key ID** identifies the key being used at any given time for all participating control units.
- A **hash code** is used to encrypt the drive authorization code when data is exchanged between the electronic key and the EZS. The code number is not generated until transmission takes place. The number is generated according to the same calculation specification in the key and in the receiver (EZS).



P80.57-2003-02

# Installation periods of drive authorization systems




*) With code 880

# Illustration of all keys used

## DAS 1 to DAS 2b

| | Keys issued | Remarks | Tracks | Buttons | 124 | 129 |
|---|---|---|---|---|---|---|
| DAS 1 |  | Standard | 2 | | | |
| | | Standard | 4 | | ✓ | ✓ |
| DAS 1a |  | SA (code 880) | 2 | 1 | | |
| | | SA (code 880) | 4 | 1 | ✓ | ✓ |
| |  | SA (code 880) as of 8 / 93 | 2 | 1 | | |
| | | SA (code 880) as of 8 / 93 Standard on model 124 as of 3 / 94 | 4 | 1 | ✓ | ✓ |
| DAS 2 |  | Standard as of 12 / 94 | 2 | 1 | | |
| | | Standard as of 12 / 94 | 4 | 1 | ✓ | ✓ |
| |  | Standard as of 3 / 96 | 2 | 1 | | |
| | | Standard as of 7 / 95 | 4 | 1 | | ✓ |
| DAS 2a |  | As of 6 / 96 | 2 | 1 | | |
| | | As of 6 / 96 | 4 | 1 | | ✓ |
| DAS 2b |  | As of 3 / 97 | 2 | 2 | | |
| | | As of 6 / 97; Emergency key omitted as of 12 / 00 | 4 | 3 | | ✓ |
| |  | Emergency key omitted as of code 800 | 2 | | | |
| |  | SA (code 880) Emergency key omitted as of code 800 | 2 | 2 | | |
| |  | Standard Emergency key omitted as of code 802 *)Omitted as of YoM 2000 | 2 | 3 | | |

| 140 | 202 | 210 | 170 | 168 | 163 |
|---|---|---|---|---|---|
| | ✓ | | | | |
| ✓ | | | | | |
| | ✓ | | | | |
| ✓ | | | | | |
| | ✓ | | | | |
| ✓ | | | | | |
| | ✓ | | | | |
| ✓ | | | | | |
| | ✓ | ✓ | | | |
| ✓ | | | | | |
| | ✓ | ✓ | ✓ | | |
| ✓ | | | | | |
| | | | ✓ | | |
| ✓ | | | | | |
| | | | | ✓ | |
| | | | | ✓ | |
| | | | | | ✓ |

# Illustration of all keys used

## DAS 3

| | Keys issued | Remarks | Tracks | Buttons | 210 | 202 | 208 | 220 | 215 |
|---|---|---|---|---|---|---|---|---|---|
| Generation 1 |  | 3 / 97<br>Emergency key omitted as of 12 / 00 | 2 | 3 | | | ✓ | | |
| | | As of 3 / 97<br>Emergency key omitted as of 12 / 00 | 2 | 3/2 | ✓ | ✓ | | | |
| Generation 2 |  | As of 5 / 00<br>Emergency key omitted as of 12 / 00 | 2 | 3 | ✓ | | ✓ | ✓ | ✓ |
| |  | KEYLESS-GO cards | | | | | | Up to 02/03 | Up to 02/03 |
| |  | With KEYLESS-GO | 2 | 3/2 | | | | As of 02/03 | As of 02/03 |
| |  | | 2 | 2 | | | | | |
| Generation 3 |  | Standard on model 221, 216, 204, others as of code 807 | 2 | 3 | | | | | |
| |  | With KEYLESS-GO | 2 | 3/2 | | | | | |
| |  | As of code 807 | 2 | 2 | | | | | |

| 230 | 203 | 209 | 211 | 219 | 164 | 251 | 169 | 245 | 171 | 221 | 216 | 204 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| ✓ | ✓ | ✓ | ✓ S211 only code 890 | ✓ | With code 890 | With code 890 | | | ✓ | | | |
| Up to 12/02 | | | | | | | | | | | | |
| As of 12/02 | | ✓ | ✓ | ✓ | | | | | | | | |
| | S203 | | S211 not code 890 | | ✓ | ✓ | ✓ | ✓ | | | | |
| ✓ | ✓ | ✓ | S211 only code 890 | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | S204 only code 890 |
| ✓ | | ✓ | ✓ | ✓ | ✓ SA up to code 807 | ✓ SA up to code 807 | | | | ✓ | ✓ | ✓ |
| | S203 | | S211 not code 890 | | ✓ | ✓ | | | | | | S204 not code 890 |

# Brief description

## Innovations

- First drive authorization system to be fitted as standard equipment

## Features

- Starter lockout
- Shift lock on vehicles with automatic transmission
- Overlapping exterior lock cylinder
- Steering lock with predetermined fracture point
- Sealed starter

## Function description of engine starting

When the vehicle is unlocked with the key, the lock switch (SN) transmits a signal to the pneumatic controller unit (PSE). This actuates the central locking (CL), anti-theft alarm system (ATA) (SA) and convenience feature (SA). In addition, the output to the immobilizer relay is switched to ground. Once the ignition is switched on, the relay switches and the engine can be started.

Once the vehicle has been locked with a key, the ground actuation to the immobilizer relay is interrupted and the engine can no longer be started.

## Special features of vehicle models

### Model 140, 202

For the immobilizer function, the PSE has an output (model 140 pin 1 to connector 2, model 202 pin 7 to connector 1) for actuating the immobilizer relay (K38).

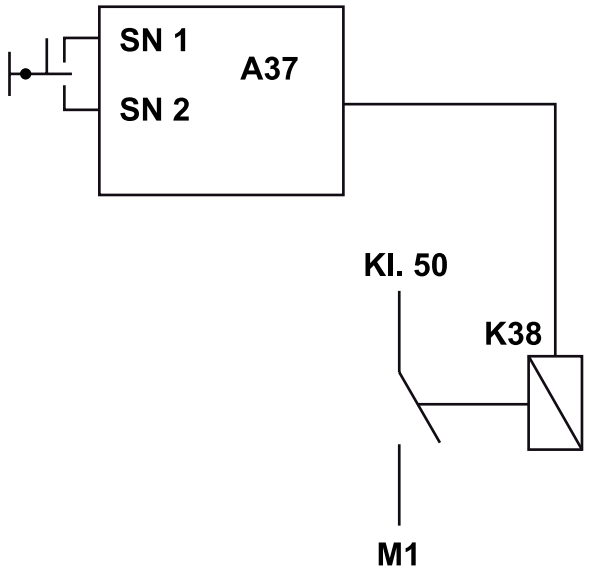



***Illustration of the principle***

| | |
|---|---|
| A37 | Pneumatic controller unit (PSE) |
| K38 | Immobilizer relay |
| M1 | Starter |
| SN | Lock switch (SN1 unlock, SN2 lock) |
| Circuit 50 | Start information to starter |

### Engine cannot be started

If the vehicle cannot be unlocked via the central locking, check whether the lock switch on the door lock is operating properly and whether the PSE is actuated.

If the vehicle can be unlocked via the central locking, check whether the immobilizer relay is actuated by the PSE. This includes checking the relevant actuation line and the operation of the relay.

Remember that other components such as the starter, the engine control unit or other parts attached to the engine may be responsible for the engine failing to start.

**Note**

Also pay attention to the general information as of page 73.

# Brief description

## Innovations

- First drive authorization system to be fitted as standard equipment
- Access authorization via infrared remote control
- Infrared receivers on driver door and trunk lid

## Features

- Starter lockout
- Shift lock on vehicles with automatic transmission
- Overlapping exterior lock cylinder
- Steering lock with predetermined fracture point
- Sealed starter
- Feedback via indicator next to IR sensor
- Identified by Code 880 (locking system with infrared remote control)

## Function description of vehicle locking / unlocking

The key transmits its signal to the receiver as a beam of infrared light. The receiver receives the beam of light, filters out any ambient light present, amplifies the signal and forwards it to the infrared remote central locking (IRCL) control unit. The control unit decodes the signal and, if the code is correct, actuates the central locking, arms or disarms the ATA (SA) and actuates the convenience feature (SA). At the same time, the control unit gets ready for the next code and blocks the previous code used.

If the key is actuated outside of the reception range, the code in the key changes but the code in the control unit does not. If the key is then actuated again within the reception range, the code of the key does not match the code calculated by the control unit. The control unit has a limited ability to calculate the code sequence. For this reason, the key has to be resynchronized if it is actuated too many times while outside the reception range.

**Note on mechanical locking and unlocking**

It is still possible to lock and unlock the vehicle mechanically. However, the central locking, the ATA (SA) and the convenience feature (SA) are not actuated in this case. Only the relevant door is locked / unlocked and the engine cannot be started.

## Function description of engine starting

When the vehicle is unlocked via the IR remote control, the infrared remote central locking (IRCL) control unit switches the output to the immobilizer relay to ground. Once the ignition is switched on, the relay switches and the engine can be started.

When the vehicle is locked with the IR remote control, the ground actuation to the immobilizer relay is interrupted and the engine can no longer be started.

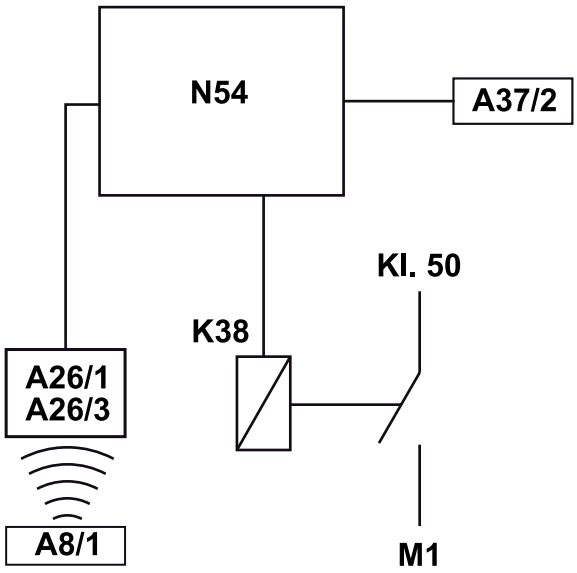



***Illustration of the principle***

| | |
|---|---|
| A8 / 1 | Transmitter key |
| A26 / 1 | Left front door infrared remote central locking (IRCL) receiver unit |
| A26 / 3 | Trunk lid infrared remote central locking (IRCL) receiver unit |
| A37 / 2 | Central locking (CL) pneumatic controller unit |
| K38 | Immobilizer relay |
| Circuit 50 | Start information to starter |
| M1 | Starter |
| N54 | Infrared remote central locking (IRCL) control unit |

## Special features of vehicle models

### Model 202

**Note**

DAS 1a was not offered on USA, Japan and Australia vehicles!

Vehicles of this model do not have a lock cylinder on the driver door. It is possible to separately unlock the front passenger door or trunk using the mechanical key in emergencies. In this case, only the lock at that particular position is unlocked.

### Model 129,140

These vehicles have a cover for the lock cylinder on the driver door. It is possible to unlock the driver door using the mechanical key in emergencies. The cover must be removed for this purpose. The alarm system triggers once the door has been opened.

### USA and Japan vehicles

On USA and Japan vehicles with DAS 1a, the lock switches (SN) are still installed on the doors. There is no cover over the lock cylinder on the driver door. The immobilizer, the ATA (SA), the central locking and the convenience feature (SA) can be actuated via the mechanical key.

# Diagnosis/procedures

## Vehicle cannot be unlocked / locked via remote control

**Note**

See page 76 for diagnosis tree for transmitter.
See page 78 for diagnosis tree for system.

## Engine cannot be started

Prerequisites

- Vehicle unlocked via IR remote control

If the vehicle can be unlocked via the central locking, check whether the immobilizer relay is actuated by the infrared remote central locking (IRCL) control unit. This includes checking the relevant actuation lines and the operation of the relay.

Remember that other components such as the starter, the engine control unit or other parts attached to the engine may be responsible for the engine failing to start.

**Note**

Also pay attention to the general information on page 73.

## Synchronizing a key

The following steps are to be performed:

1. Point the transmitter key at an external receiver and press the transmit button once briefly.
2. Switch on the ignition within the next 30 s.

### Vehicles with decoupled lock switch (retrofitted)

1. Point the transmitter key at an external receiver and press the transmit button once briefly.
2. Press the synchronization switch in the trunk within the next 30 s.

## Desynchronizing the control unit

If a key is lost, the infrared remote central locking (IRCL) control unit must be desynchronized and the mechanical lock must be replaced if necessary. Menu-assisted desynchronization can be performed with the handheld tester (HHT) or with Star Diagnosis. All of the other keys which are still in the owner's possession must then be resynchronized.

## Replacing the control unit

Order the infrared remote central locking (IRCL) control unit with the chassis number and synchronize all keys after replacement.

### Innovations

- Inside locking button

### Features

- Activation / deactivation of immobilizer via infrared remote control
- Start interruption
- Ignition and fuel interruption on vehicles with manual transmission
- Shift lock on vehicles with automatic transmission
- System identified by Code 885 (locking system with infrared remote control and immobilizer)

**Note**

The system was not available for USA and Japan vehicles or for right-hand drive vehicles.

### Function description of vehicle locking / unlocking

The key transmits its signal to the receiver as a beam of infrared light. The receiver receives the beam of light, filters out any ambient light present, amplifies the signal and forwards it to the infrared remote central locking (IRCL) control unit. The control unit decodes the signal and, if the code is correct, actuates the central locking, arms or disarms the ATA (SA) and actuates the convenience feature (SA). At the same time, the control unit gets ready for the next code and blocks the previous code used. The feedback lamps flash 3x.

If the key is actuated outside of the reception range, the code in the key changes but the code in the control unit does not. If the key is then actuated again within the reception range, the code of the key does not match the code calculated by the control unit. However, the control unit has a limited ability to calculate the code sequence. For this reason, the key has to be resynchronized if it is actuated too many times while outside the reception range.

**Note on mechanical locking and unlocking**

It is still possible to lock and unlock the vehicle mechanically. However, the central locking, the ATA (SA) and the convenience feature (SA) are not actuated in this case. Only the relevant door is locked / unlocked and the engine cannot be started.

# Brief description

## Function description of engine starting

### Vehicles with automatic transmission

The signal from the remote control is forwarded to the infrared remote central locking (IRCL) control unit via the external receivers. The infrared remote central locking (IRCL) control unit switches the immobilizer relay. The shift lock function of the automatic transmission acts as an additional security feature.

### Vehicles with manual transmission, gasoline engine

The signal from the remote control is forwarded to the infrared remote central locking (IRCL) control unit via the external receivers. The control unit switches the relays for the immobilizer and the fuel pump and the actuation signal (circuit 15) for the motor electronics.

### Vehicles with manual transmission, diesel engine

The signal from the remote control is forwarded to the infrared remote central locking (IRCL) control unit via the external receivers. The control unit switches the immobilizer relay. In addition, the vacuum valve for the injection pump and the solenoid valve in the fuel line are disconnected.

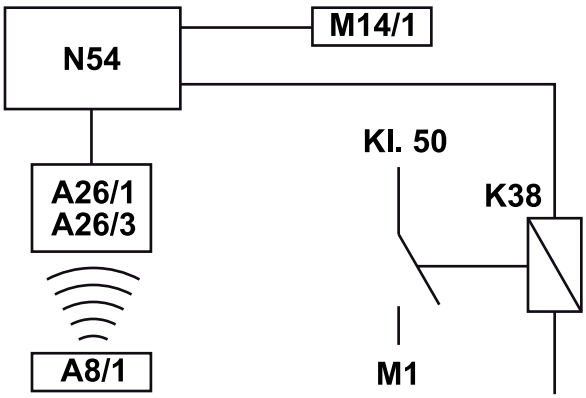



*Illustration of principle for automatic transmission*

| | |
|---|---|
| A8 / 1 | Transmitter key |
| A26 / 1 | Left front door infrared remote central locking (IRCL) receiver unit |
| A26 / 3 | Trunk lid infrared remote central locking (IRCL) receiver unit |
| K38 | Immobilizer relay |
| Circuit 50 | Start information to starter |
| M1 | Starter |
| M14 / 1 | Central locking (CL) supply pump |
| N54 | Infrared remote central locking (IRCL) control unit |

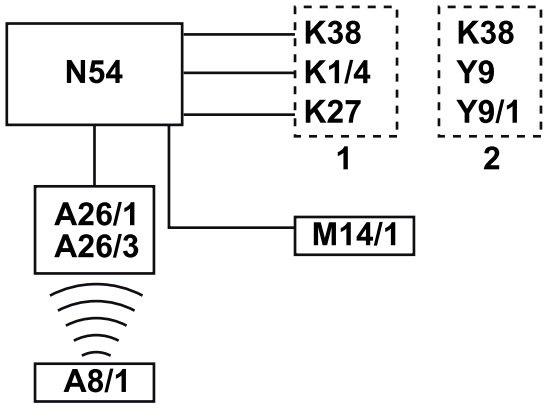



*Illustration of principle for manual transmission*

| | |
|---|---|
| A8 / 1 | Transmitter key |
| A26 / 1 | Left front door infrared remote central locking (IRCL) receiver unit |
| A26 / 3 | Trunk lid infrared remote central locking (IRCL) receiver unit |
| K1 / 4 | HFM / PMS interruption relay |
| K27 | Fuel pump relay |
| K38 | Immobilizer relay |
| M14 / 1 | Central locking (CL) supply pump |
| N54 | Infrared remote central locking (IRCL) control unit |
| Y9 | Fuel shutoff valve |
| Y9 / 1 | Key shutoff switchover valve |
| | |
| 1 | Gasoline vehicles |
| 2 | Diesel vehicles |

### Vehicle cannot be unlocked / locked via remote control

**Note**

See page 76 for diagnosis tree for transmitter.
See page 78 for diagnosis tree for system.

### Engine cannot be started

**Prerequisites**

- Vehicle unlocked via IR remote control

Check the relevant relays and solenoid valves for proper operation including their actuation lines. The components differ according to the type of transmission and engine so it is important to determine which variant is installed.

Remember that other components such as the starter / starter relay, an engine control unit or other parts attached to the engine may be responsible for the engine failing to start.

**Note**

Also pay attention to the general information on page 73.

### Synchronizing a key

**The following steps are to be performed:**

1. Point the transmitter key at an external receiver and press the transmit button once briefly.
2. Switch on the ignition within the next 30 s.

**Vehicles with decoupled lock switch (retrofitted)**

1. Point the transmitter key at an external receiver and press the transmit button once briefly.
2. Press the synchronization switch in the trunk within the next 30 s.

### Desynchronizing the control unit

If a key is lost, the infrared remote central locking (IRCL) control unit must be desynchronized and the mechanical lock must be replaced. Menu-assisted desynchronization can be performed with the HHT or STAR DIAGNOSIS. All of the other keys which are still in the owner's possession must then be resynchronized.

### Replacing the control unit

Order the infrared remote central locking (IRCL) control unit with the chassis number and synchronize all keys after replacement.

# Brief description

## Innovations

- Intervention in engine control system via CAN or PWM
- Additional DAS infrared control unit

## Features

- Activation / deactivation of immobilizer via infrared remote control
- Start interruption
- Ignition and fuel interruption on vehicles with manual transmission
- Shift lock on vehicles with automatic transmission
- System identified by Code 888 (IR remote control with drive authorization)

For insurance-related reasons, vehicles of model A124 were equipped with a drive authorization system capable of intervention in the engine management system.

The following model designations are affected:

- A124 E 20 (124.060) (intervention in engine management system via PWM)
- A124 E 22 (124.062) (intervention in engine management system via CAN)
- A124 E 32 (124.066) (intervention in engine management system via CAN)

## Function description of vehicle locking / unlocking

The key transmits its signal to the receiver as a beam of infrared light. The receiver receives the beam of light, filters out any ambient light present, amplifies the signal and forwards it to the infrared remote central locking (IRCL) control unit via a control line. The control unit decodes the signal and, if the code is correct, actuates the central locking, arms or disarms the ATA (SA) and actuates the convenience feature. At the same time, the control unit gets ready for the next code and blocks the previous code used.

If the key is actuated outside of the reception range, the code in the key changes but the code in the control unit does not. If the key is then actuated again within the reception range, the code of the key does not match the code expected by the control unit. However, the control unit has a limited ability to calculate the code sequence. For this reason, the key has to be resynchronized if it is actuated too many times while outside the reception range.

**Note on mechanical locking and unlocking**

It is still possible to lock and unlock the vehicle mechanically. However, the central locking, the ATA (SA) and the convenience feature (SA) are not actuated in this case. Only the relevant door is locked / unlocked and the engine cannot be started.

### Function description of engine starting

For the start enable signal to be issued, the vehicle must be unlocked via infrared.

After the ignition is switched on, the DAS infrared control unit exchanges the drive authorization data with the ME-SFI [ME] control unit. If both values match, the start enable signal is issued.

The engine control system is locked when the ignition is switched off. The DAS infrared control unit is connected to the ME-SFI [ME] control unit via CAN or PWM.

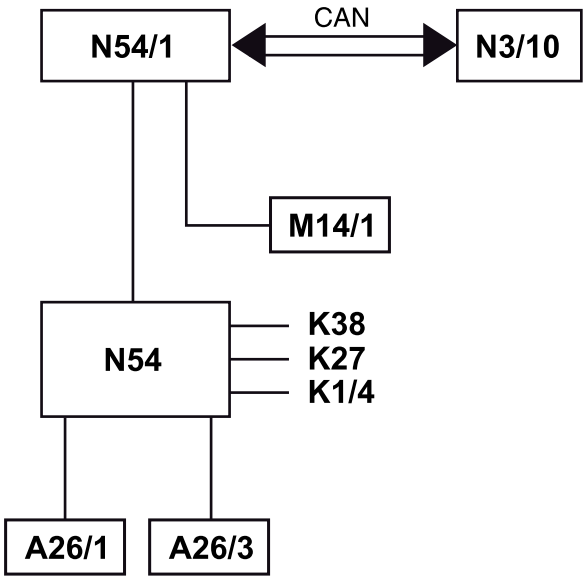



***Illustration of the principle (version with CAN)***

| | |
|---|---|
| A26 / 1 | Left front door infrared remote central locking (IRCL) receiver unit |
| A26 / 3 | Trunk lid infrared remote central locking (IRCL) receiver unit |
| K1 / 4 | HFM / PMS interruption relay |
| K27 | Fuel pump relay |
| K38 | Immobilizer relay |
| M14 / 1 | Central locking (CL) supply pump |
| N3 / 10 | ME-SFI [ME] control unit |
| N54 | Infrared remote central locking (IRCL) control unit |
| N54 / 1 | DAS infrared control unit |
| | |
| CAN | Controller Area Network |

# Diagnosis/procedures

### Vehicle cannot be unlocked/locked via remote control

**Note**

See page 76 for diagnosis tree for transmitter.
See page 78 for diagnosis tree for system.

### Engine cannot be started

Requirement

- Vehicle unlocked via IR remote control

**Note**

- Data exchange between the ME-SFI [ME] control unit and the DAS infrared control unit only takes place immediately after the ignition is switched on.
- The DAS infrared control unit only appears in the quick test if the vehicle has been unlocked.

**Note**

See page 85 for diagnosis tree.

### Synchronizing a key

**The following steps are to be performed:**

1. Point the transmitter key at an external receiver and press the transmit button once briefly.
2. Switch on the ignition within the next 30 s.

**Vehicles with decoupled lock switch (retrofitted)**

1. Point the transmitter key at an external receiver and press the transmit button once briefly.
2. Press the synchronization switch in the trunk within the next 30 s.

### Desynchronizing the control unit

If a key is lost, the control unit must be desynchronized and the mechanical lock must be replaced if necessary. Menu-assisted desynchronization can only be performed with the HHT or STAR DIAGNOSIS. All of the other keys which are still in the owner's possession must then be resynchronized.

### Replacing the control unit

**DAS infrared control unit**

The DAS infrared control unit communicates with the engine control unit. It is located on the crossmember behind the glove box.

The control unit must be ordered with the chassis number. The variant coding must be performed with the HHT or STAR DIAGNOSIS. The variant coding is menu-assisted.

**Infrared remote central locking (IRCL) control unit**

Order the infrared remote central locking (IRCL) control unit with the chassis number and synchronize all keys after replacement.

**ME-SFI [ME] control unit**

The ME-SFI [ME] control unit must be ordered with the chassis number. After variant coding, identification of the immobilizer must be performed. The engine control unit must be locked after the function test.

### Innovations

- Infrared receiver and indicator on inside rearview mirror
- Spare key in the form of a bank card with mechanical key and remote control function

### Features

- Activation / deactivation via infrared remote control
- Intervention in engine control system (communication via CAN or PWM)
- Diesel engines without engine control unit fitted with electronic shutoff valve on injection pump (communication via CAN)

### Function description of vehicle locking / unlocking

The key transmits its signal to the receiver as a beam of infrared light. The receiver receives the beam of light, filters out any ambient light present, amplifies the signal and forwards it to the infrared remote central locking (IRCL) control unit via a control line. The control unit decodes the signal and, if the code is correct, actuates the central locking, arms or disarms the ATA (SA) and actuates the convenience feature (SA). At the same time, the control unit gets ready for the next code and blocks the previous code used. The feedback lamps on the door handle of the driver door and on the inside rearview mirror are actuated.

If the key is actuated outside of the reception range, the code in the key changes but the code in the control unit does not. If the key is then actuated again within the reception range, the code of the key does not match the code calculated by the control unit. The control unit has a limited ability to calculate the code sequence. For this reason, the key has to be resynchronized if it is actuated too many times while outside the reception range.

**Note on mechanical locking and unlocking**

It is still possible to lock and unlock the vehicle mechanically. However, the central locking, the ATA (SA) and the convenience feature (SA) are not actuated in this case. Only the relevant door is locked / unlocked and the engine cannot be started.

# Brief description

### Function description of engine starting

For the start enable signal to be issued, the vehicle must be unlocked via infrared.

After the ignition is switched on, the engine control unit exchanges the drive authorization data with the engine control unit via CAN or PWM. If both values match, the start enable signal is issued.

The engine control system is locked when the ignition is switched off.

On diesel vehicles with drive authorization system shutoff valve (DSV), the fuel supply is enabled through communication between the infrared remote central locking (IRCL) control unit and the DSV.

### Meaning of feedback lamps on inside rearview mirror

| Grn | Red | Green and red alternating | Green and red simultaneously | Flash duration | Meaning | Remedy / test step |
|---|---|---|---|---|---|---|
| x | | | | Approx. 3 s | Valid IR unlock signal Vehicle unlocked | |
| | x | | | Approx. 3 s | Valid IR lock signal Vehicle locked | |
| | | x | | Approx. 30 s | No enable signal from engine control | See Body Diagnosis Manual |
| | | | x | Approx. 30 s | Transmitter battery voltage too low | Replace transmitter batteries |

## Special features of vehicle models

### Special features of USA / Japan version

USA and Japan vehicles are still fitted with lock switches (SN) on the doors. Activation / deactivation of the immobilizer, ATA (SA), central locking and convenience feature (SA) is also possible using the mechanical key but there is no feedback via the receiver unit on the inside rearview mirror or via the function indicator on the driver door in this case. There is no cover over the lock cylinder on the driver door.

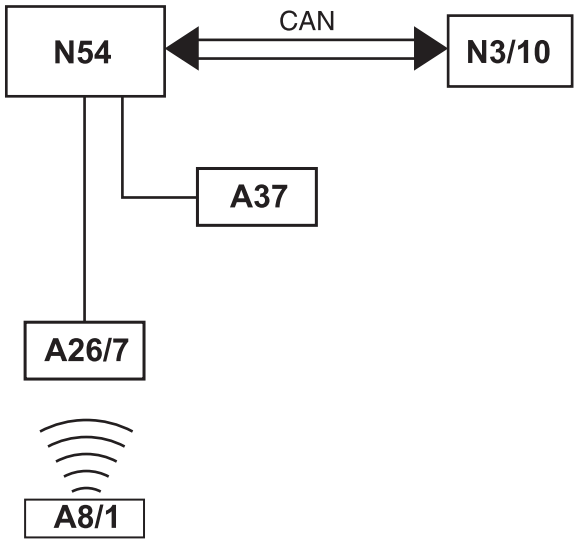



***Illustration of the principle (gasoline engine with CAN)***

| | |
|---|---|
| A8 / 1 | Transmitter key |
| A26 / 7 | Inside rearview mirror infrared remote control receiver unit |
| A37 | Pneumatic controller unit (PSE) multifunction |
| N3 / 10 | ME-SFI [ME] control unit |
| N54 | Infrared remote central locking (IRCL) control unit |
| CAN | Controller Area Network |

### Communication procedure used

| Injection system | Data transfer via |
|---|---|
| PMS gasoline injection and ignition system | Pulse width modulation (PWM) |
| LH sequential multiport fuel injection system | Pulse width modulation (PWM) |
| HFM gasoline injection and ignition system | CAN data bus |
| Electronic distributor-type fuel injection (EVE) (as of 09 / 94) | Pulse width modulation (PWM) |
| Electronic in-line fuel injection (ERE) (as of 09 / 94) | CAN data bus (PWM) |
| M / RSF in-line fuel injection | CAN data bus |
| ME-SFI [ME] gasoline injection and ignition system | CAN data bus |

# Diagnosis/procedures

### Determining actual values

It is possible to check which keys are authorised via a HHT or STAR DIAGNOSIS. Synchronization of the individual keys can be checked. In addition, the HHT or STAR DIAGNOSIS displays the number of the current key. The display also indicates whether the infrared remote central locking (IRCL) control unit is permanently assigned to the vehicle. The actual value query process is menu-assisted.

**Note**

Also pay attention to the general information as of page 73.

**Note**

- Data exchange between the engine control unit and the infrared remote central locking (IRCL) control unit only takes place immediately after the ignition is switched on.
- The infrared remote central locking (IRCL) control unit only appears in the quick test if the vehicle has been unlocked.

### Vehicle cannot be unlocked/locked via remote control

**Note**

See page 76 for diagnosis tree for transmitter.
See page 78 for diagnosis tree for system.

### Engine cannot be started

- Vehicle unlocked via IR remote control

**Note**

See page 84 for diagnosis tree.

### Synchronizing a key

The following steps are to be performed:

1. Point the transmitter key at the receiver in the inside rearview mirror and press the transmitter button twice briefly.
2. Switch on the ignition within the next 30 s.

### Disabling a key

If a key is lost or stolen, it must be disabled via the HHT or STAR DIAGNOSIS. The remote control then no longer operates.

There are 2 options for disabling a key:

1. Revocably i.e. the disabled key can be reauthorized via the HHT or STAR DIAGNOSIS.
2. Irrevocably i.e. the disabled key cannot be reauthorized under any circumstances.

Ensure that you are in possession of all remaining keys. Using the HHT or STAR DIAGNOSIS, the number of the missing key can be determined and the key can be disabled.

### Replacing the control unit

**Infrared remote central locking (IRCL) control unit**

Order the infrared remote central locking (IRCL) control unit with the chassis number.

All keys must be synchronized after variant coding with the HHT or STAR DIAGNOSIS.

**Engine control unit**

The engine control unit must be ordered with the chassis number. After variant coding, identification of the immobilizer must be performed. The engine control unit must be locked after the function test.

# Brief description

## Innovations

- Separation of access authorization and drive authorization
- Drive authorization via key with transponder
- Trunk lid remote control (HDF) (SA)
- Feedback via turn signals

## Features

- Infrared remote control via receiver on inside rearview mirror
- Feedback (red / green) via inside rearview mirror
- Self-arming when key removed from ignition lock
- Intervention in engine control system, communication via CAN
- Lock cylinders only on driver door and rear end on all models
- The spare key (in the format of a bank card) is a fully functional vehicle key. The card is equipped with infrared functionality and the transponder required for starting is integrated in the key bit.

## Function description of vehicle locking / unlocking

The key transmits its signal to the receiver as a beam of infrared light. The receiver receives the beam of light, filters out any ambient light present, amplifies the signal and forwards it to the infrared remote central locking (IRCL) control unit via a control line. The control unit decodes the signal and, if the code is correct, actuates the central locking, arms or disarms the ATA (SA) and actuates the convenience feature (SA). At the same time, the control unit gets ready for the next code and blocks the previous code used.

If the key is actuated outside of the reception range, the code in the key changes but the code in the control unit does not. If the key is then actuated again within the reception range, the code of the key does not match the code calculated by the control unit. The control unit has a limited ability to calculate the code sequence. For this reason, the key has to be resynchronized if it is actuated too many times while outside the reception range.

If the vehicle is locked and infrared control unit receives a valid infrared code from a key via the inside rearview mirror receiver, the infrared remote central locking (IRCL) control unit actuates the central locking, the feedback lamps in the inside rearview mirror (approx. 3 s, red = lock, green = unlock) and the turn signals (lock: 3x, unlock: 1x).

If the vehicle is locked and the ignition is switched on (IR control unit detects a valid transponder signal), the vehicle is unlocked and the green feedback lamp is actuated.

If the supply voltage is < 9 V, no IR signal is detected and no functions are triggered.

After a voltage failure, the control unit is returned to the state it was in before the voltage failure occurred.

**Note on mechanical locking and unlocking**

It is still possible to lock and unlock the vehicle mechanically. However, the central locking, the ATA (SA) and the convenience feature (SA) are not actuated in this case. Only the relevant door is locked / unlocked and the engine cannot be started.

**Note on USA and Japan version**

Japan vehicles are still fitted with lock switches (SN) on the doors. There is no cover over the lock cylinder on the driver door. Activation / deactivation of the immobilizer, the ATA (SA), the central locking and the convenience feature (SA) is thus also possible via the mechanical key. However, no feedback is given by the turn signals or feedback lamps in the inside rearview mirror.

### The infrared remote control is nonfunctional under the following conditions:

- Ignition on
- For 2 s after ignition off

### Function description of engine starting

The drive authorization system (enabling of engine control) is independent of the infrared remote control and the charge level of the battery in the key. Operation of the drive authorization system is based on the exchange of a valid variable code between the transponder in the key and the infrared remote central locking (IRCL) control unit via the coil in the steering lock. When the ignition is switched on, the coil is supplied with energy by the magnetic field of the transponder. The drive authorization code is then transferred to the infrared remote central locking (IRCL) control unit via the transponder. If the code is found to be valid, the engine control system is enabled via communication between the infrared remote central locking (IRCL) control unit and the engine control unit. Once the vehicle reaches a speed of >20 km / h, new content is written to the data block which was read out from the transponder.

### Possible causes of start enable failure

- The transponder code is invalid
- The energy for the transponder cannot be generated
- No communication between infrared remote central locking (IRCL) control unit and engine control unit after ignition switched on"

# Brief description

### Meaning of feedback lamps on inside rearview mirror

| Grn | Red | Green and red alternating | Green and red simultaneously | Flash duration | Meaning | Remedy / test step |
|---|---|---|---|---|---|---|
| x | | | | Approx. 3 s | Valid IR unlock signal Vehicle unlocked | |
| | x | | | Approx. 3 s | Valid IR lock signal Vehicle locked | |
| | | x | | Approx. 30 s | No enable signal from engine control | See Body Diagnosis Manual |
| | | | x | Approx. 30 s | Transmitter battery voltage too low | Replace transmitter batteries |

**Note**

Not valid for model 170.

## Special features of vehicle models

### Model 170

On model 170, the IRCL receiver unit is in the roof frame (A26 / 9) and feedback is issued via the turn signals.

### USA / Japan

On USA / Japan vehicles, the central locking, the ATA (SA) and the convenience closing feature (SA) can be operated via the lock cylinders (lock switches) in the driver door and on the trunk lid in addition to operation via the infrared remote control. The feedback lamps and turn signals are not actuated.

### Japan

For legal reasons, locking feedback via the turn signals is suppressed when the hazard warning system is switched on. As a result, an additional relay between the infrared remote central locking (IRCL) control unit and the turn signal actuation system is switched for feedback.

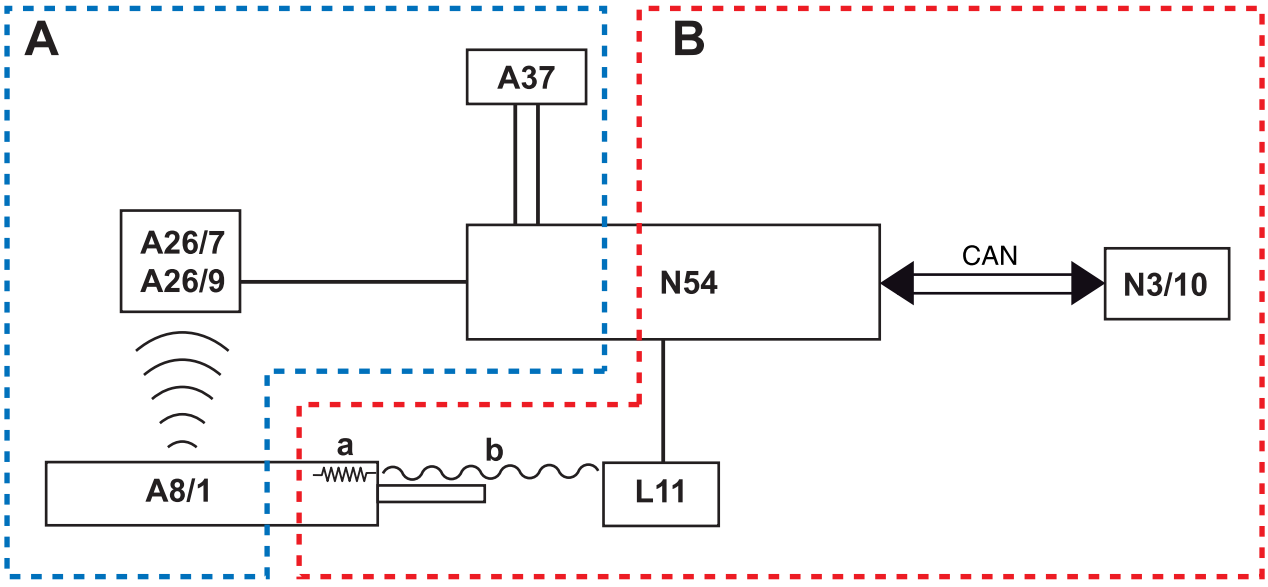



***Illustration of the principle (gasoline engine)***

| | |
|---|---|
| A8 / 1 | Transmitter key |
| A26 / 7 | Inside rearview mirror infrared remote control receiver unit |
| A26 / 9 | IRCL receiver unit in upper roof frame (only model 170) |
| A37 | Pneumatic controller unit (PSE) |
| L11 | Transponder coil |
| N3 / 10 | ME-SFI [ME] control unit |
| N54 | Infrared remote central locking (IRCL) control unit |
| CAN | Controller Area Network |
| A | Access authorization |
| B | Drive authorization |
| a | Transponder |
| b | Inductive signal |

# Diagnosis/procedures

### Determining actual values

It is possible to check which keys are authorised via a HHT or STAR DIAGNOSIS. Synchronization of the individual keys can be checked. In addition, the HHT (or STAR DIAGNOSIS) displays the number of the current key. The display also indicates whether the infrared remote central locking (IRCL) control unit is permanently assigned to the vehicle. The actual value query process is menu-assisted.

**Note**

- Data exchange between the engine control unit and the infrared remote central locking (IRCL) control unit only takes place immediately after the ignition is switched on.
- The infrared remote central locking (IRCL) control unit only appears in the quick test if the vehicle has been unlocked.

**Note**

Also pay attention to the general information as of page 73.

### Vehicle cannot be unlocked/locked via remote control

**Note**

See page 76 for diagnosis tree for transmitter.
See page 78 for diagnosis tree for system.

### Engine cannot be started

**Note**

See page 85 for diagnosis tree.

### Synchronizing a key

The following steps are to be performed:

1. Point the transmitter key at the receiver in the inside rearview mirror and press the transmitter button twice briefly.
2. Switch on the ignition within the next 30 s.

When synchronization is successfully completed, a locked vehicle is unlocked.

### Disabling a key

If a key is lost or stolen, it must be disabled via the HHT or STAR DIAGNOSIS. The remote control then no longer operates.

There are 2 options for disabling a key:

1. Revocably i.e. the disabled key can be reauthorized via the HHT or STAR DIAGNOSIS.
2. Irrevocably i.e. the disabled key cannot be reauthorized under any circumstances.

Ensure that you are in possession of all remaining keys. Using the HHT or STAR DIAGNOSIS, the number of the missing key can be determined and the key can be disabled.

### Replacing the control unit

**Infrared remote central locking (IRCL) control unit**

Order the infrared remote central locking (IRCL) control unit with the chassis number.

All keys must be synchronized after variant coding with the HHT or STAR DIAGNOSIS.

**Engine control unit**

The engine control unit must be ordered with the chassis number. After variant coding, identification of the immobilizer must be performed. The engine control unit must be locked after the function test.

# Brief description

## Innovations

The DAS X drive authorization system is based on DAS 2a (immobilization via transponder). It is supplemented by the features of 1a (infrared remote control with external receivers).

## Features

- Only for USA vehicles (code 491 / 494)
- Operated via IR transmitter key and mechanical key
- Self-arming when key removed from ignition lock
- Drive authorization via infrared key with transponder
- 3 IR receivers:
  - Model 202 / 210 driver door / rear end / inside rearview mirror
  - Model 129 / 140 driver door / front passenger door / rear end
- Feedback is only issued by the actuated receiver
- Two control units (IRCL 1a and DAS 2a)
- Intervention in engine control system (communication via CAN)

## Lock switch function

The central locking, the ATA and the convenience closing feature can be actuated via the lock cylinders (lock switches) in addition to actuation via the infrared remote control.

## Remote trunk lid release (HDF)

The HDF function (SA) can only be actuated on a locked vehicle by pressing the infrared key twice (within 0.8 s). The vehicle is unlocked and the trunk lid is opened.

## Function description of vehicle locking / unlocking

### Unlock vehicle

If the vehicle is locked and a valid IR code is received, the vehicle is unlocked. The green feedback lamp flashes on the respective IR receiver which was actuated.

The vehicle is also unlocked centrally when mechanically unlocked via the lock cylinders. However, the green lamps do not provide any feedback.

### Lock vehicle

If the vehicle is unlocked and a valid IR code is received, the vehicle is locked. The red feedback lamp flashes on the respective IR receiver which was actuated.

The vehicle can also be locked mechanically via the lock cylinders. However, the red lamps do not provide any feedback.

## The infrared remote control is nonfunctional under the following conditions:

- Ignition on
- For 2 s after ignition off

## Function description of engine starting

The drive authorization system (enabling of engine control) is independent of the infrared remote control and the charge level of the battery in the key. The coil in the steering lock allows the exchange of a valid variable code between the transponder in the key and the DAS infrared control unit. When the ignition is switched on, the coil is supplied with energy by the magnetic field of the transponder. The drive authorization code is then transmitted to the DAS infrared control unit via the transponder. If this is found to be valid, the engine control system is enabled through communication between the DAS infrared control unit and engine control unit. Once the vehicle reaches a speed of >20 km / h, new content is written to the data block which was read out from the transponder.

## Possible causes of start enable failure

- The transponder code is invalid
- The energy for the transponder cannot be generated
- No communication between DAS infrared control unit and engine control unit after ignition switched on

# Brief description

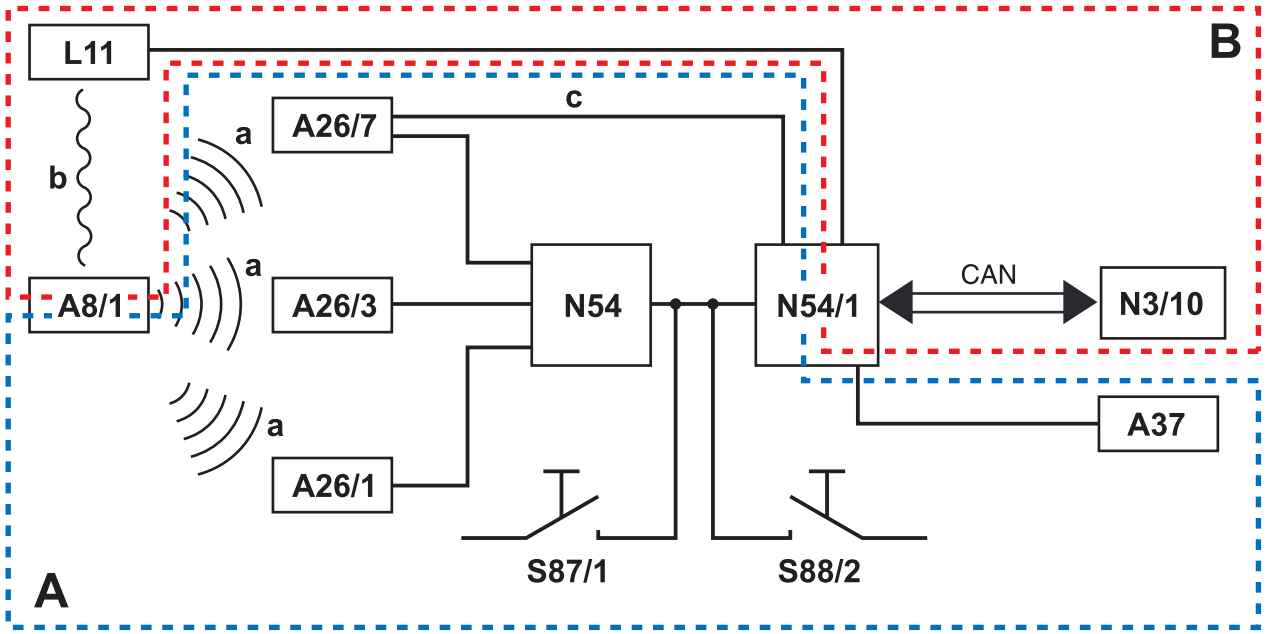



***Illustration of the principle (model 202)***

| | |
|---|---|
| A8 / 1 | Transmitter key |
| A26 / 1 | Left front door infrared remote central locking (IRCL) receiver unit |
| A26 / 3 | Trunk lid infrared remote central locking (IRCL) receiver unit |
| A26 / 7 | Inside rearview mirror infrared remote control receiver unit |
| A37 | Pneumatic controller unit (PSE) |
| L11 | Transponder coil |
| N3 / 10 | ME-SFI [ME] control unit |
| N54 | Infrared remote central locking (IRCL) control unit |
| N54 / 1 | DAS infrared control unit |
| S87 / 1 | Right front lock switch (convenience) |
| S88 / 2 | Trunk lid lock switch (convenience) |
| CAN | Controller Area Network |
| A | Access authorization |
| B | Drive authorization |
| a | Infrared signal |
| b | Inductive signal |
| c | Power supply 5 V |

### Determining actual values

It is possible to check which keys are authorised via a HHT or STAR DIAGNOSIS. Synchronization of the individual keys can be checked. In addition, the HHT or STAR DIAGNOSIS displays the number of the current key in the DAS infrared control unit. The display also indicates whether the infrared remote central locking (IRCL) and DAS infrared control units are permanently assigned to the vehicle. The actual value query process is menu-assisted.

**Note**

- Data exchange between the engine control unit and the DAS infrared control unit only takes place immediately after the ignition is switched on.
- The DAS infrared control unit only appears in the quick test if the vehicle has been unlocked.

**Note**

Also pay attention to the general information as of page 73.

### Vehicle cannot be unlocked / locked via remote control

**Note**

See page 76 for diagnosis tree for transmitter.
See page 78 for diagnosis tree for system.

### Engine cannot be started

**Note**

See page 85 for diagnosis tree.

# Diagnosis/procedures

## Synchronizing a key

The following steps are to be performed:

1. Point key at a receiver and actuate
2. Switch on the ignition within the next 30 s or lock / unlock with lock cylinder.

## Desynchronizing the control unit

If a key is lost, the infrared remote central locking (IRCL) control unit must be desynchronized and the mechanical lock must be replaced if necessary. Menu-assisted desynchronization can be performed with the HHT or STAR DIAGNOSIS. All of the other keys which are still in the owner's possession must then be resynchronized.

## Disabling a key

If a key is lost or stolen, it must be disabled in the DAS infrared control unit via the HHT or STAR DIAGNOSIS. The remote control then no longer operates. The disabling process is menu-assisted.

There are 2 options for disabling a key:

1. Revocably i.e. the disabled key can be reauthorized via the HHT (or STAR DIAGNOSIS).
2. Irrevocably i.e. the disabled key cannot be reauthorized under any circumstances.

Ensure that you are in possession of all remaining keys. Using the HHT or STAR DIAGNOSIS, the number of the missing key can be determined and the key can be disabled.

## Replacing the control unit

### Infrared remote central locking (IRCL) control unit

Order the infrared remote central locking (IRCL) control unit with the chassis number and synchronize all keys after replacement.

### DAS infrared control unit

The DAS infrared control unit must be ordered with the chassis number. The variant coding must be also performed with the HHT or STAR DIAGNOSIS. The variant coding is menu-assisted.

### Engine control unit

The engine control unit must be ordered with the chassis number. After variant coding, identification of the immobilizer must be performed. The engine control unit must be locked after the function test.

**Note**

If a key is lost or stolen, the key must be disabled in the DAS infrared control unit and the infrared remote central locking (IRCL) control unit must additionally be desynchronized!

## Innovations

- Access and drive authorization via radio remote control control unit for central locking (radio frequency DAS) (on model 168 SA)
- Selective unlocking (driver door and fuel filler flap)
- Automatic locking during start-off (can be switched off)
- Relocking, if neither door nor liftgate opened after 40 s
- Key with additional PANIC button, only for USA

## Features

- Transponder for data transfer
- Radio receiver antenna in interior compartment
- Feedback via turn signals
- Intervention in engine control system (communication via CAN)
- Self-arming when key removed from ignition lock

**Note**

**Model 168**
DAS radio frequency control unit without radio remote control function with lock switches is fitted as standard

**Model 129 / 140**

Including infrared remote central locking (DAS radio frequency / infrared control unit)

## Function description of vehicle locking / unlocking

The radio signal is read in directly by the DAS radio frequency control unit. The antenna is a wire antenna located in the area behind the instrument cluster.
If a valid radio signal is received by the DAS radio frequency control unit, a signal is sent to the PSE or instrument cluster (model 168) and to the ATA (SA)
The turn signals are actuated at the same time (1x for unlocking, 3x for locking).

### Global / selective unlocking

The key can be reprogrammed from global unlocking (all doors, trunk lid and fuel filler flap) to selective unlocking (only driver door and fuel filler flap) by pressing the lock and unlock buttons at the same time (until the LED lights up).

## Function description of engine starting

The drive authorization system (enabling of engine control) is independent of the radio remote control and the charge level of the battery in the key. The coil in the steering lock allows the exchange of a valid variable code between the transponder in the key and the DAS radio frequency control unit. After the ignition is switched on, the coil is supplied with energy by the magnetic field of the transponder and the drive authorization code is transmitted to the DAS radio frequency control unit via the transponder. If the code is valid, the engine control system is enabled via communication between the DAS radio frequency control unit and engine control unit. Once the vehicle reaches a speed of >20 km / h, new content is written to the data block which was read out from the transponder.

# Brief description

## Possible causes of start enable failure

- The transponder code is invalid
- The energy for the transponder cannot be generated
- No communication between DAS radio frequency control unit and engine control unit after ignition switched on

In these cases, the message "Start Error" appears on the instrument cluster

## Special features of vehicle models

**Model 129 / 140**

During unlocking, the PSE is actuated by the DAS radio frequency control unit via a ground signal.

**Model 170**

During unlocking, the multifunction control unit is actuated by the DAS radio frequency control unit. The multifunction control unit then transmits the opening signal to the PSE over CAN.

**Model 168**

The instrument cluster actuates the central locking supply pump.

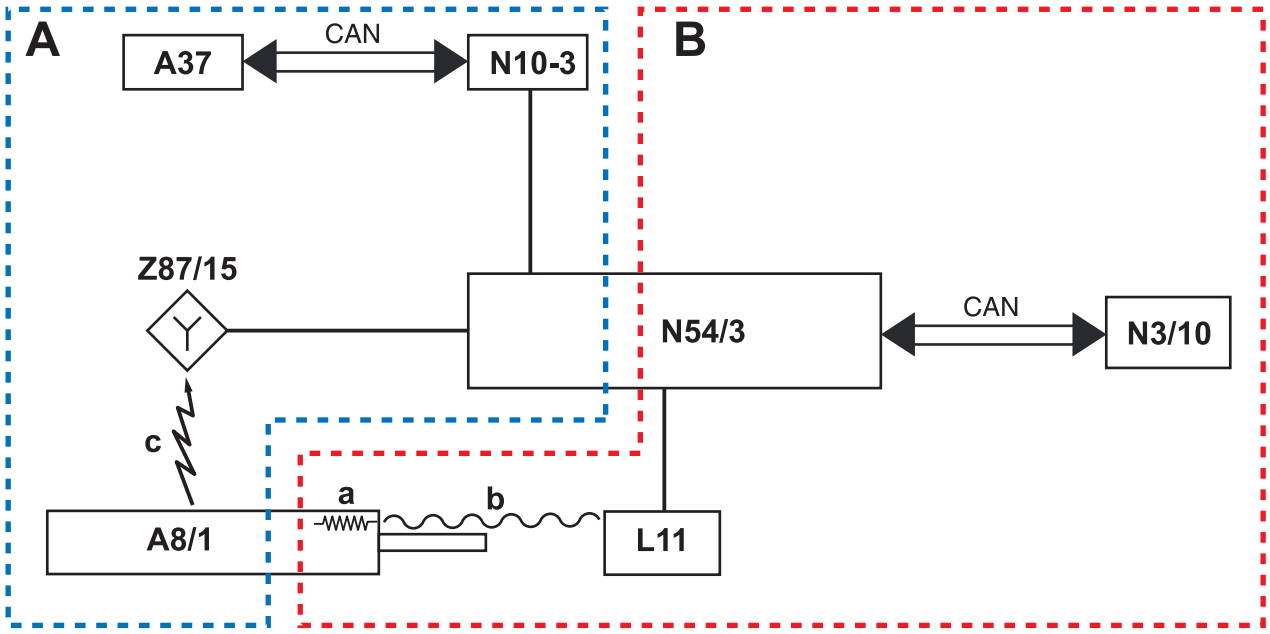



***Illustration of the principle (model 170)***

| | |
|---|---|
| A8 / 1 | Transmitter key |
| A37 | Pneumatic controller unit (PSE) |
| L11 | Transponder coil |
| N3 / 10 | ME-SFI [ME] control unit |
| N10-3 | Multifunction control unit |
| N54 / 3 | DAS radio frequency control unit |
| Z87 / 15 | Radio frequency antenna wire end |

| | |
|---|---|
| CAN | Controller Area Network |
| A | Access authorization |
| B | Drive authorization |
| a | Transponder |
| b | Inductive signal |
| c | Radio signal |

### Determining actual values

It is possible to check which keys are authorised via a HHT or STAR DIAGNOSIS. Synchronization of the individual keys can be checked. In addition, the HHT or STAR DIAGNOSIS displays the number of the current key. The display also indicates whether the DAS radio frequency control unit is permanently assigned to the vehicle. The actual value query process is menu-assisted.

**Note**

Data exchange between the engine control unit and the DAS radio frequency control unit only takes place immediately after the ignition is switched on.

**Note**

Also pay attention to the general information as of page 73.

### Vehicle cannot be unlocked / locked via remote control

**Note**

See page 77 for diagnosis tree for transmitter.
See page 80 for diagnosis tree for system.

**Note on model 168**

The radio remote control may be nonfunctional in various locations.
This is caused by the superimposition of radio signals from interfering transmitters. A lock switch can be retrofitted to the driver door as a remedy (see WIS document AF80.35-P-6002A).

### Engine cannot be started

**Note**

See page 86 for diagnosis tree.

# Diagnosis/procedures

## Synchronizing a key

The following steps are to be performed:

1. Press lock or unlock button twice briefly.
2. Switch on the ignition within the next 30 s.

## Disabling a key

If a key is lost or stolen, it must be disabled via the HHT or STAR DIAGNOSIS. The remote control then no longer operates. The disabling process is menu-assisted.

There are 2 options for disabling a key:

1. Revocably i.e. the disabled key can be reauthorized via the HHT (or STAR DIAGNOSIS).
2. Irrevocably i.e. the disabled key cannot be reauthorized under any circumstances.

Ensure that you are in possession of all remaining keys. Using the HHT or STAR DIAGNOSIS, the number of the missing key can be determined and the key can be disabled.

## Replacing the control unit

### DAS radio frequency control unit

The DAS radio frequency control unit must be ordered with the chassis number.

All keys must be synchronized after variant coding with the HHT or STAR DIAGNOSIS.

### Engine control unit

The engine control unit must be ordered with the chassis number. After variant coding, identification of the immobilizer must be performed. The engine control unit must be locked after the function test.

### Innovations

- All Activity Module (AAM) with integrated drive authorization as central on-board electronic system
- Electric actuation of central locking elements

### Features

- Access authorization via radio remote control
- Transponder for data transfer
- Automatic locking during start-off (can be switched off)
- Self-arming when key removed from ignition lock
- Selective unlocking (driver door and fuel filler flap)
- Relocking, if neither door nor liftgate opened after 40 s

### Special features

The vehicle is delivered with 3 keys. The master key, also known as the "Mickey Mouse key", occupies track 1. Once the AAM is programmed, this becomes a key which can be used normally.

### Function description of vehicle locking / unlocking

The radio signal is read in directly by the AAM control unit. The antenna is a wire antenna located on the A-pillar on the driver side. The central locking motors and ATA (SA) are actuated if a valid radio signal is received by the AAM control unit. The turn signals are actuated at the same time (1x for unlocking, 3x for locking).

#### Global / selective unlocking

The key can be reprogrammed from global unlocking (all doors, trunk lid and fuel filler flap) to selective unlocking (only driver door and fuel filler flap) by pressing the lock and unlock buttons at the same time until the LED lights up.

### Function description of engine starting

Drive authorization is verified after the key is turned to position "1". Inductive energy is transferred to the key so that drive authorization can be checked without the need for an additional source of energy (e.g. key battery).

When a key in the ignition lock is turned to position "2" (ignition on), the engine control unit transmits a request to the AAM. This calculates the code and transmits it to the engine control unit. Calculation is performed in the engine control unit at the same time and both results are compared here. If they match, the engine control unit issues the start enable signal.

When the vehicle reaches a speed of > 8 km / h, the AAM calculates a new variable code and writes it to the key transponder. The old variable code value is thus overwritten.

# Brief description

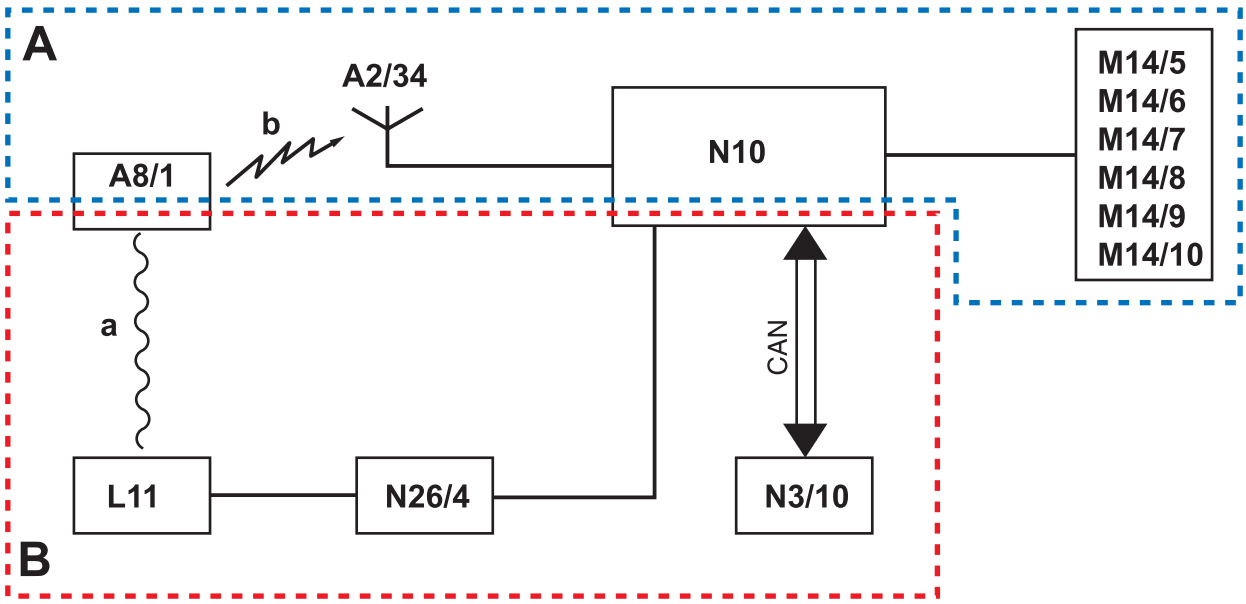



***Illustration of the principle (gasoline engine)***

| | |
|---|---|
| A2 / 34 | Central locking antenna |
| A8 / 1 | Transmitter key |
| L11 | Transponder coil |
| M14 / 5 | Right front door central locking motor |
| M14 / 6 | Left front door central locking motor |
| M14 / 7 | Rear-end door central locking motor |
| M14 / 8 | Left rear door central locking motor |
| M14 / 9 | Right rear door central locking motor |
| M14 / 10 | Fuel filler flap central locking motor |
| N3 / 10 | ME-SFI [ME] control unit |
| N10 | All Activity Module (AAM) |
| N26 / 4 | Mercedes-Benz immobilizer |
| CAN | Controller Area Network |
| A | Access authorization |
| B | Drive authorization |
| a | Inductive signal |
| b | Radio signal |

### Determining actual values

It is possible to check which keys are authorised via STAR DIAGNOSIS. Synchronization of the individual keys can be checked. In addition, STAR DIAGNOSIS displays the number of the current key. The display also indicates whether the AAM control unit is permanently assigned to the vehicle. The actual value query process is menu-assisted.

**Note**

Data exchange between the engine control unit and AAM only takes place immediately after the ignition is switched on.

**Note**

Also pay attention to the general information as of page 73.

### Vehicle cannot be unlocked/locked via remote control

**Note**

See page 77 for diagnosis tree for transmitter.
See page 82 for diagnosis tree for system.

### Engine cannot be started

**Note**

See page 87 for diagnosis tree.

# Diagnosis/procedures

## Synchronizing a key

The following steps are to be performed:

1. Switch on ignition
2. Check whether the key is recognized as valid (ATA state display flashes)
3. Remove key from the ignition lock
4. Within 10 seconds:
   - Press "unlock" button, hold and at the same time
   - Press "lock" button five times in succession
   - Then press any button

## Disabling a key

If a key is lost or stolen, it must be disabled via STAR DIAGNOSIS. The remote control then no longer operates. The disabling process is menu-assisted.

There are 2 options for disabling a key:

1. Revocably i.e. the disabled key can be reauthorized via STAR DIAGNOSIS.
2. Irrevocably i.e. the disabled key cannot be reauthorized under any circumstances.

Ensure that you are in possession of all remaining keys. Using STAR DIAGNOSIS, the number of the missing key can be determined and the key can be disabled.

## Replacing the control unit

### AAM

The new AAM must be programmed with the master key. This must be ordered with the chassis number. All keys must be synchronized after variant coding.

The master key can be used as a normal key and should therefore be handed over to the customer. The old master key (track 1) must be destroyed.

### Engine control unit

The engine control unit must be ordered with the chassis number. After variant coding, identification of the immobilizer must be performed. The engine control unit must be locked after the function test.

**Note**

New keys or a new AAM control unit must be taught in with STAR DIAGNOSIS.

### Innovations

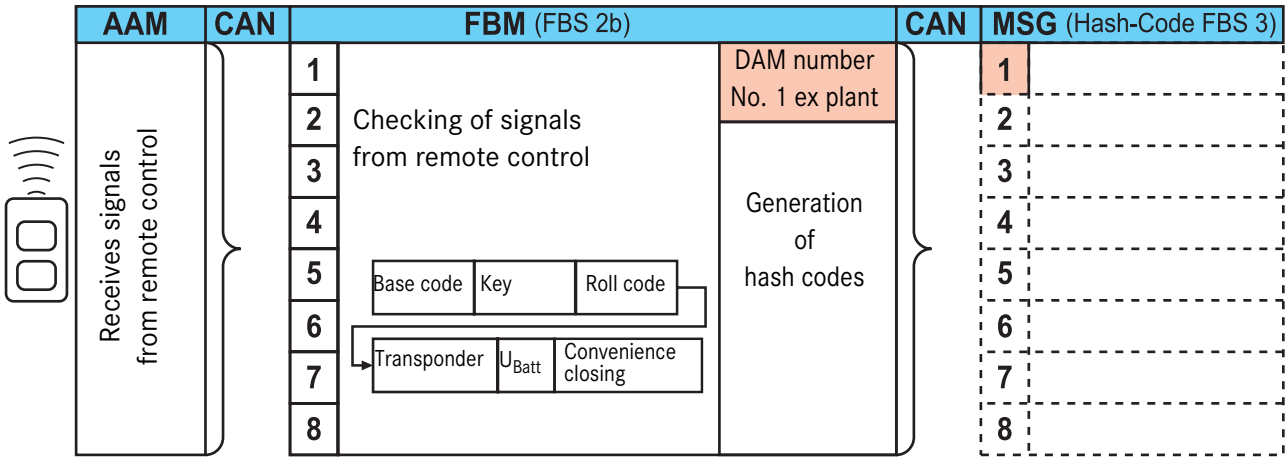
- Drive authorization via drive authorization module (DAM) (DAS control unit)
- Access authorization (AAM) and drive authorization (DAM is plugged into Extended Activity Module (EAM)) are performed by two control units

### Features

- Access authorization via radio remote control
- Transponder for data transfer
- Automatic locking during start-off (can be switched off)
- Self-arming when key removed from ignition lock
- Selective unlocking (driver door and fuel filler flap)
- Drive authorization module (DAM) for the drive authorization function
- All Activity Module (AAM) for the access authorization function
- Relocking, if neither door nor liftgate opened after 40 s

The DAM checks the validity of the signals received by the key. If they are valid, a hash code is generated and transmitted to the engine control unit (ECU).

The drive authorization principle is illustrated below:




The DAM is inserted in the EAM. The DAM has no direct electrical connection to the rest of the vehicle electronic system. The required CAN communication with the ECU takes place via the EAM.

The transponder integrated in the key is amplified by the Mercedes-Benz immobilizer, read out via the transponder coil and checked for validity in the drive authorization module. When the key is turned to position "2" in the ignition lock (circuit 15, ignition on), the ECU requests the enable signal / start authorization from the DAM via the CAN bus.

# Brief description

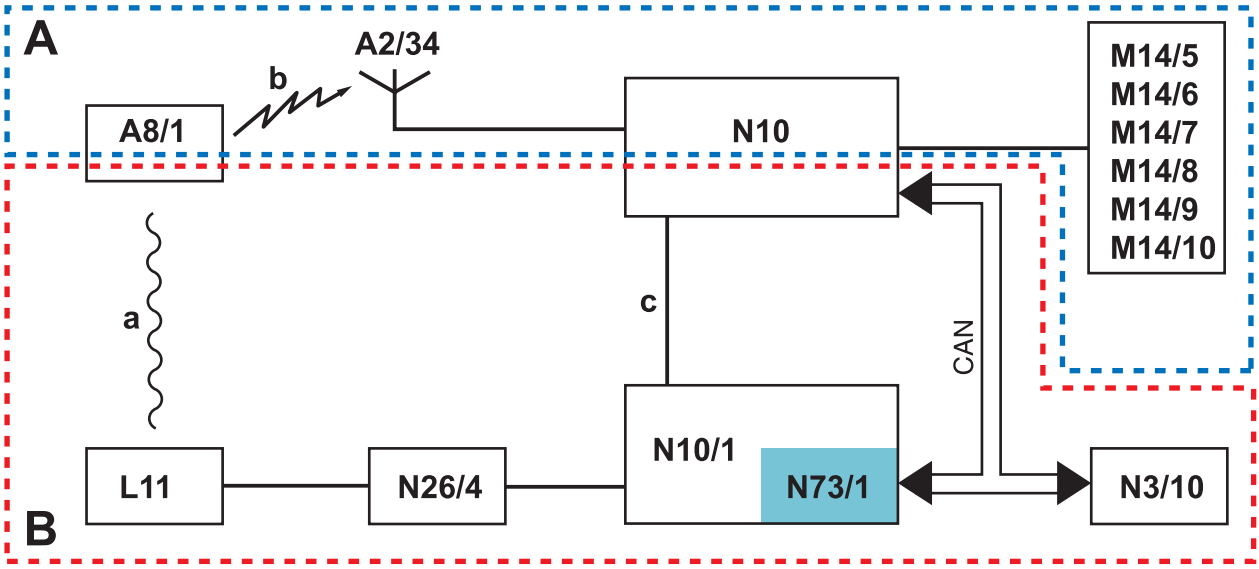



***Illustration of the principle (gasoline engine)***

| | |
|---|---|
| A2 / 34 | Central locking antenna |
| A8 / 1 | Transmitter key |
| L11 | Transponder coil |
| M14 / 5 | Right front door central locking motor |
| M14 / 6 | Left front door central locking motor |
| M14 / 7 | Rear-end door central locking motor |
| M14 / 8 | Left rear door central locking motor |
| M14 / 9 | Right rear door central locking motor |
| M14 / 10 | Fuel filler flap central locking motor |
| N3 / 10 | ME-SFI [ME] control unit |
| N10 | All Activity Module (AAM) |
| N10 / 1 | Extended Activity Module (EAM) |
| N26 / 4 | Mercedes-Benz immobilizer |
| N73 / 1 | DAS control unit |

| | |
|---|---|
| CAN | Controller Area Network |
| A | Access authorization |
| B | Drive authorization |
| a | Inductive signal |
| b | Radio signal |
| c | Wake-up signal |

## Function description of vehicle locking / unlocking

The radio signal is read in directly by the AAM control unit. The antenna is a wire antenna located on the A-pillar on the driver side. The central locking motors are actuated and the ATA (SA) is deactivated / activated if a valid radio signal is received by the AAM control unit. The turn signals are actuated at the same time (1x for unlocking, 3x for locking).

### Global / selective unlocking

The key can be reprogrammed from global unlocking (all doors, trunk lid and fuel filler flap) to selective unlocking (only driver door and fuel filler flap) by pressing the lock and unlock buttons at the same time (until the LED lights up).

## Function description of engine starting

Drive authorization is verified after the key is turned to position "1". Inductive energy is transferred to the key so that drive authorization can be checked without the need for an additional source of energy (e.g. key battery).

The check to determine whether an authorised key has been inserted in the ignition lock takes place between the key and the DAM (the Mercedes-Benz immobilizer, transponder coil and EAM act as intermediaries).

If no authorised key is recognized, the message "Start error" appears on the instrument cluster.

When the key is turned to position "2" (circuit 15, ignition on), the DAM transmits the drive authorization code to the engine control unit. If the code is valid, the ignition and fuel supply are enabled.

When the vehicle reaches a speed of > 8 km / h, the DAM calculates a new variable code and writes it to the key transponder. The old variable code value is thus overwritten.

# Diagnosis/procedures

### Determining actual values

It is possible to check which keys are authorised via STAR DIAGNOSIS. Synchronization of the individual keys can be checked. In addition, STAR DIAGNOSIS displays the number of the current key. The display also indicates whether the DAM is permanently assigned to the vehicle. The actual value query process is menu-assisted.

**Note**

Data exchange between the engine control unit and DAM only takes place immediately after the ignition is switched on. Note that the DAM is plugged into the EAM and the connections are therefore on the EAM.

**Note**

Also pay attention to the general information as of page 73.

### Vehicle cannot be unlocked/locked via remote control

**Note**

See page 77 for diagnosis tree for transmitter.
See page 82 for diagnosis tree for system.

### Engine cannot be started

**Note**

See page 89 for diagnosis tree.

### Synchronizing a key

The following steps are to be performed:

1. Switch on ignition
2. Check whether the key is recognized as valid (ATA state display flashes)
3. Remove key from the ignition lock
4. Within 10 seconds:
   - Press "unlock" button, hold and at the same time
   - Press "lock" button five times in succession
   - Then press any button

### Disabling a key

If a key is lost or stolen, it must be disabled via STAR DIAGNOSIS. The remote control then no longer operates. The disabling process is menu-assisted.

There are 2 options for disabling a key:

1. Revocably i.e. the disabled key can be reauthorized via STAR DIAGNOSIS.
2. Irrevocably i.e. the disabled key cannot be reauthorized under any circumstances.

Ensure that you are in possession of all remaining keys. Using STAR DIAGNOSIS, the number of the missing key can be determined and the key can be disabled.

### Replacing the control unit

#### All Activity Module (AAM)

The AAM can be replaced without a master key. Variant coding must be performed. The keys must then be synchronized.

#### Extended Activity Module (EAM)

The EAM is not tied to the chassis number because the theft-relevant part is contained in the drive authorization module (DAM).

#### DAS control unit

The DAS control unit is plugged into the EAM and must be ordered with the chassis number.

#### Engine control unit

The engine control unit must be ordered with the chassis number. After variant coding, identification of the immobilizer must be performed. The engine control unit must be locked after the function test.

**Note**

New keys or a new DAS control unit must be taught in with STAR DIAGNOSIS.

# Brief description

## Innovations

- Bidirectional infrared data transfer between key and EZS
- Electronic key
- Electric steering lock
- Electronic selector lever module (ESM)
- Intelligent servo module (ISM)

## Features

- Drive authorization and access authorization are separate
- Infrared remote control function (receiver on driver door and, on some versions, front passenger door) for convenience closing and summer opening (side windows and sliding roof)
- Automatic locking of CL at speeds above approx. 15 km / h
- Feedback via turn signals (3x locked; 1x unlocked)
- Electronic immobilizer which operates through data exchange between key-EZS-engine control unit
- Relocking, if neither door nor liftgate opened after 40 s

The shape of the mechanical key is changed when the design of the housing for the electronic key is changed. For this reason, the mechanical key must be replaced at the same time if the shape of the housing of the replacement part has changed.

The emergency key can still be ordered as a replacement part.

### Key track

A vehicle's locking data record has 8 key tracks.

Only one key can operate on each key track meaning that a maximum of 8 keys can be used simultaneously on any one vehicle.

### Key segment

- There are 3 segments per key track
- Key in segment 1 = Original key or extra key
- Key in segment 2 or 3 = Spare key

| | Key segment | | |
|---|---|---|---|
| **Key track** | **1** | **2** | **3** |
| **1** | ~~Key 1~~ | ~~Spare key 1~~ | Spare key 2 |
| **2** | Key 2 | | |
| **3** | Extra key 1 | | |
| **4** | | | |
| **5** | | | |
| **6** | | | |
| **7** | | | |
| **8** | | | |
| | | | |
| ~~  ~~ | = Key segment disabled | | |

***Applies to vehicles as of 01 / 2001 without KEYLESS-GO***

New vehicles are delivered with two keys. They are each programmed into key segment 1 on key tracks 1 and 2 respectively. If an **extra key** is requested for the vehicle, this is programmed into segment 1 of the next free key track.

A **spare key** must be ordered if a key is lost or defective. This key is programmed on to the same key track but in a different segment.

If a key which was programmed into key segment 3 is lost, this key track must be disabled.

# Explanation of terms

### Spare key

- Replaces a key that was created previously
- Only operational after being taught in to vehicle
- Can only unlock the central locking before it is taught in to vehicle
- Programmed into segment 2 or 3 of a key track
- Programmed in the event of key defect, loss or theft

### Extra key

- Represents an additional key along with the previously available ones
- Always programmed into segment 1 of a key track
- Only programmed if a customer requests an additional key for his / her vehicle or if another key track is completely used up.

**Note**

Spare keys and / or extra keys must always be taught in to the vehicle by MB staff for theft protection reasons and must be checked for proper operation (see latest DRT circular for more information).

### Transport protection

A control unit cannot be put into operation when transport protection is active. A release code is required to deactivate the transport protection. This is transferred before initial startup using STAR DIAGNOSIS or the workshop key.

### Personalizing DAS components

Data relevant to locking are written to the EZS, ELV, engine control unit, ESM, ISM and fully integrated transmission control unit (VGS)

**Procedure**

- Personalize EZS using workshop key; personalization data are in the workshop key.
  The serial number of the EZS must be specified to program the workshop key. The workshop key only personalizes the EZS with the previously stated serial number.
- The components (ELV, engine control unit, ESM, VGS and ISM) are personalized via the EZS with STAR DIAGNOSIS.
- The ELV must be personalized using the workshop key on vehicles with a market launch after 2007.

### Activation of DAS components

- Irrevocable assignment of component to vehicle
- To be performed before vehicle leaves workshop with new parts

### Disabling a key track

- The key for the disabled track is completely nonfunctional (access and drive authorization)
- The disabling process must be performed via STAR DIAGNOSIS and is menu-assisted
- When disabling with STAR DIAGNOSIS, ensure that the disabling of the key track is documented in VeDoc. Enclose DAS printout with repair order as proof of disabling!
- If possible, disable using the workshop key
- Key tracks 1-8 can be disabled all in one go or individually using the workshop key

### Enabling a key track

- Cancels all disabling restrictions
- Only possible with workshop key
- Key tracks 1-8 can be enabled all in one go or individually using the workshop key

### Mechanical locking

- The driver door or trunk lid can be unlocked in an emergency after failure of the electronic access authorization system
- Replacement of the mechanical locking system after the loss or theft of a key should be discussed with the customer

## Teach-in periods for spare keys on DAS 3

| | Spare key | Status indication on instrument cluster | EZS | ELV | ESM | ISM | Eng. ctrl. unit | NAT 2 |
|---|---|---|---|---|---|---|---|---|
| **Model 202/208/210** | 125 min | – | 80 min | 50 min | – | – | 40 min | – |
| **Model 203/209** | 95 min | "Vehicle calculating" | 45 min | 50 min | – | – | 40 min | 45 min |
| **Model 171/211/219** | 95 min | "Vehicle calculating" | 35 min | 50 min | – | – | 40 min | 45 min |
| **Model 215/220** | 260 min | "Vehicle calculating" | 80 min | – | 180 min | – | 40 min | 45 min |
| **Model 230** | 135 min | "Vehicle calculating" | 45 min | 50 min | 90 min | – | 40 min | 45 min |
| **Model 169/245** | 50 min | "Vehicle calculating" | 20 min | 30 min | – | – | 20 min | |
| **Model 216/221** | 45 min | "Vehicle calculating" | 2 min | – | – | 30 min | 20 min | 45 min |
| **Model 164/251** | 45 min | "Vehicle calculating" | 2 min | – | – | 30 min | 20 min | 45 min |
| **Model 204** | 95 min | "Vehicle calculating" | 3 min | 50 min | – | – | 20 min | 45 min |

# Teach-in periods for spare keys on DAS 3

The teach-in process begins when the spare key is inserted in the EZS.

The ignition must be switched on when the teach-in process is finished in the EZS and ELV. Then, the spare key is taught in to the engine control unit, ESM, ISM and transmission control unit. The teach-in process runs simultaneously in the control units.

The teach-in process is aborted by removing the key (for EZS and ELV) or by switching off the ignition (for ESM, ISM, transmission control unit or engine control unit). The teach-in process is restarted if the key is reinserted or the ignition is switched on. The calculation time increases accordingly.

**Note**

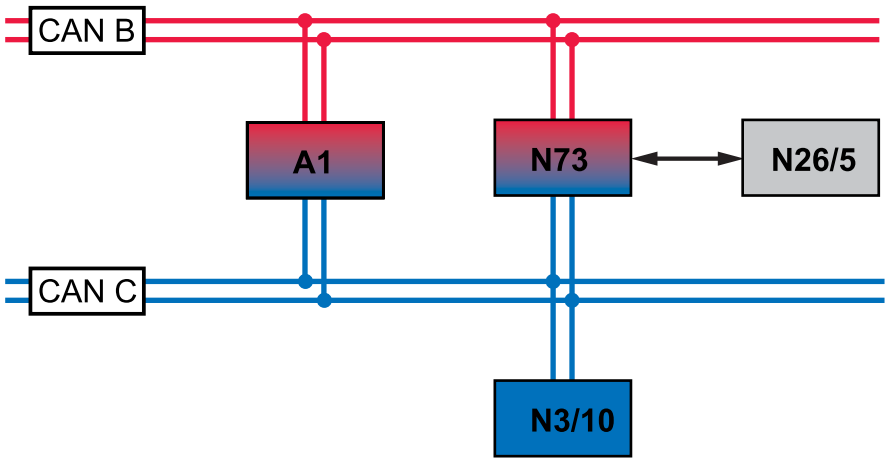
Keys with KEYLESS-GO functionality are inserted into the EZS control unit and teach-in is performed as for a "normal key".

## Possible causes of long calculation times

- Vehicle undervoltage can cause the teach-in process to abort. The teach-in process is restarted after the reset.
- A spare key has already been programmed (to the same key track) but was not taught in. This doubles the teach-in period.

# Function description

**Block diagram**




***Simplified illustration for model 169***

| | |
|---|---|
| A1 | Instrument cluster |
| N3 / 10 | ME-SFI [ME] control unit |
| N26 / 5 | Electric steering lock (ELV) control unit |
| N73 | EZS control unit |
| CAN B | Interior CAN |
| CAN C | Engine compartment CAN |

## Function description of vehicle locking / unlocking

The key transmits a radio signal and an infrared signal simultaneously.

- The radio signal is forwarded to a control unit on the interior CAN via the antenna and antenna amplifier. A check is then made to determine whether the key belongs to the vehicle. If so, the CAN bus is woken and the access authorization data are transmitted to the EZS.
- The infrared signal is received by the receiver in the door handle, filtered and forwarded to the door control unit. A check is then made to determine whether the key belongs to the vehicle. If so, the CAN bus is woken and the access authorization data are transmitted to the EZS.
- Access authorization data which are found to be correct by the EZS are transferred to the central locking motors via the relevant control units and turn signal feedback is issued.

### Global / selective unlocking

The key can be reprogrammed from global unlocking (all doors, trunk lid and fuel filler flap) to selective unlocking (only driver door and fuel filler flap) by pressing the lock and unlock buttons at the same time (until the LED lights up).

### Function description of engine starting

Drive authorization is verified after the key is inserted into the EZS. Inductive energy is transferred to the key and a check is made between the key and EZS. If an authorized key is detected, the ELV (if installed) enables the steering and relays an acknowledgment signal to the EZS. The EZS releases the key lock. The key can then be turned to the ignition "on" position and the engine control unit is supplied with power.

The key lock in the EZS was omitted as of the introduction of model 204 (March 2007).

If the ELV does not unlock or if the key is defective, the key can be turned but the ignition is not switched on. If a key which does not belong to the vehicle is used, the fault message "Key does not belong to vehicle" appears on the instrument cluster.

After the ignition is switched on, the authentication test is performed between the engine control unit and the EZS. If this is successful, the engine control unit issues the start enable signal.

**Note**

If it is not possible to engage a gear range after the engine is started, check the actual value for drive authorization in the EZS depending on the transmission variant installed.

**Note**

The key lock in the EZS was omitted on models 164 / 251, 169 / 245 and 216 / 221 with modification year 08 (06 / 08).

# Diagnosis/procedures

**If a guided test is available in STAR DIAGNOSIS, this must always be performed.**

All keys are required for effective diagnosis in the workshop.

Also see SI80.57-P-0001C

### Determining actual values

It is possible to check which key tracks are disabled via STAR DIAGNOSIS. The numbers of the current key and keys last used can also be read out. In addition, it is possible to read out whether drive authorization has been issued in the individual control units. It is also possible to check whether the control units have been activated.

**Note**

Also pay attention to the general information as of page 73.

### Vehicle cannot be unlocked / locked via remote control

This procedure only applies to vehicles with DAS3 for which a guided test in STAR DIAGNOSIS is not possible.

Vehicles without guided test:
Models 202 / 208, 210, 215 / 220, 216 / 221 and 230.

### Test prerequisites

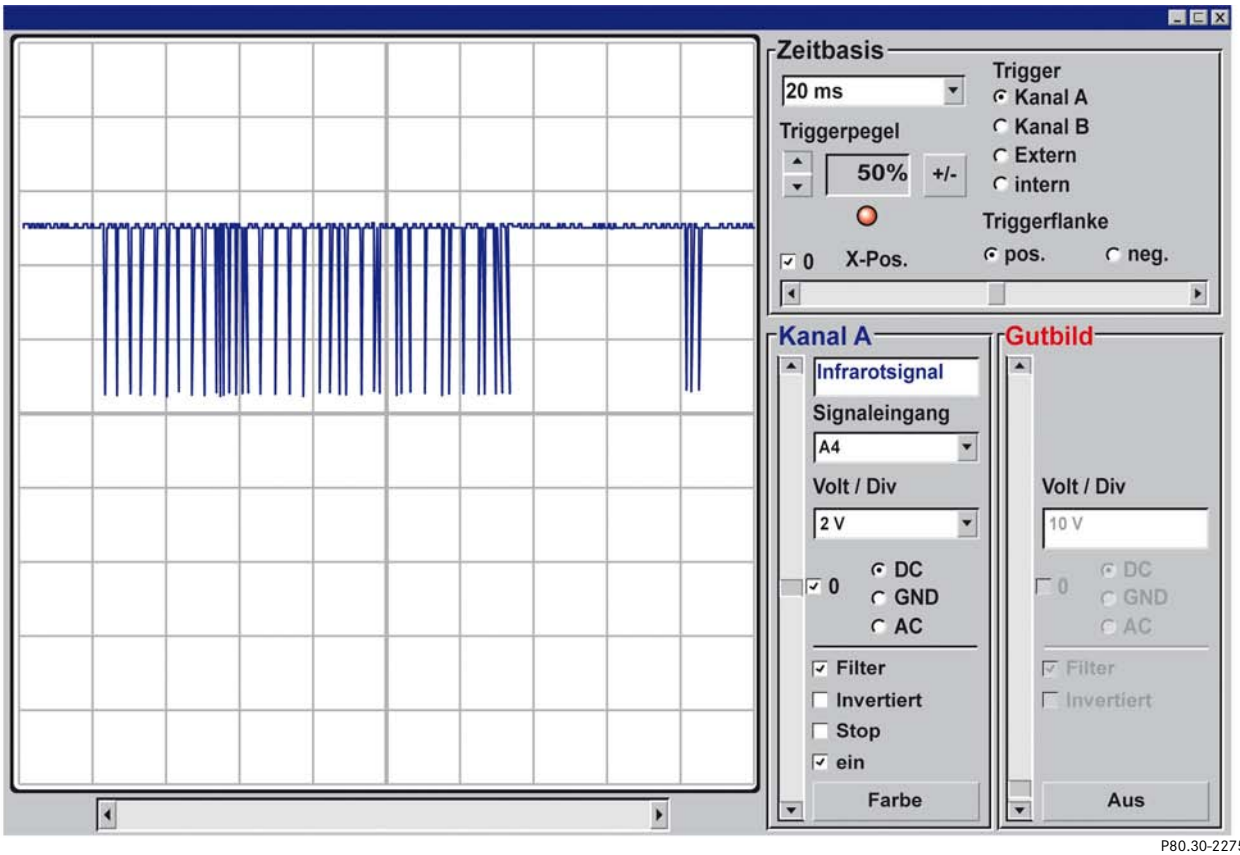
- It is important to ensure that the affected key tracks are enabled. The actual values of the EZS control unit must be read out with STAR DIAGNOSIS for this purpose.
- The batteries in the key must be OK (LED lights up briefly upon actuation).

**Note**

See page 83 for system diagnosis tree.

### Pass image of data exchange between IR receiver and door control unit

The data line between the infrared receiver and door control unit was recorded for the following pass image.




P80.30-2275-00

# Diagnosis/procedures

### Engine cannot be started

### Test requirements

It is important to ensure that the affected key tracks are enabled. The actual values of the EZS control unit, engine control unit and, if necessary, the ESM, ISM and VGS control units must be read out with STAR DIAGNOSIS for this purpose.

**Note**

See page 91 for diagnosis tree.

**Note**

If the start procedure is not aborted, there is no problem with drive authorization.

## Replacing the control unit

### EZS control unit

Personalize the EZS using the workshop key. Workshop keys must be ordered with the chassis number. A function test must subsequently be performed on all keys.

**Note for model 202/208, 210, 215/220**

There are engine control units with DAS 2 coding and with DAS 3 coding for these models. **The ignition must be switched on before the EZS is activated**. Only then can the EZS detect which coding is in use.
See SI80.57-P-0001A for more information.

### Electric steering lock (ELV) control unit

The electric steering lock (ELV) control unit must be ordered with the chassis number (for models with market launch before 2007). Personalization takes place via STAR DIAGNOSIS.

As of model 204 (market launch March 2007), the workshop key is used for personalization and only this has to be ordered with the chassis number.

### Engine control unit, transmission control unit, electronic selector lever module (ESM) control unit

Order control units with the chassis number and personalize and activate with STAR DIAGNOSIS.

The electronic selector lever module (ESM) control unit only has to be ordered with chassis number for model 215/220 and 230.

### Intelligent servo module (ISM)

The intelligent servo module (ISM) must be personalized and activated with STAR DIAGNOSIS after installation.

## Responsibilities

Mercedes-Benz records all vehicle data in its in-house VeDoc system. When replacement parts are ordered, all of the theft-relevant parts (DRT) are registered and some of these may only be released after the chassis number has been specified.

Since the introduction of the electronic immobilizer, the protection of theft-relevant parts is the most important supporting measure in the prevention of vehicle theft. For this reason, theft-relevant parts are subject to special security precautions from the point where they are manufactured right through to their installation in a vehicle, including the entire transportation process. In the service and sales organizations, special ordering, programming and documentation procedures must be complied with. In addition, internal information and sensitive data must be carefully secured. The security instructions in the DRT process procedures help you to achieve this and it is important to note that these process procedures are also in place to protect everyone involved in the handling of theft-relevant parts.

Pay attention to the latest circulars on dealing with theft-relevant parts.

- If you have any questions regarding the **ordering process** or if you have any **problems with new parts you have ordered** please contact your national representative via Sorry-Web or XSF.
- If you have any **technical problems**, please contact your product support office.

### Lost key

Disable the key track or desynchronize the infrared remote central locking (IRCL) control unit and replace the mechanical lock if necessary.

**Notes**

If you are sure that the lost key cannot be misused, it is not necessary to replace the mechanical lock.

### Extra key requested

Order an extra key. Before handing over the key to the customer, check it for proper operation on the vehicle (access and drive authorization).

### Replacing the mechanical lock

Replacement of the mechanical lock must be entered in VeDoc. Only then may a key be ordered.

Note that on systems before DAS 3, only the mechanical part of the lock number is changed.

**Note**

Please contact your national representative if you are not able to change the documentation in VeDoc.

# Procedures/ordering process

## Ordering keys with ES2 code for DAS 2, 2a, X, 2b

When a key is ordered, a key for the next free key track is always delivered. If 8 keys have already been issued, the key track can be specified on the order. This is done by adding the ES2 code for the key track to the respective order number.

Example:

Key for model 210 on key track 4:
A 210 769 20 06 ES2 0004

Each key has its own storage space in the DAS control unit. When a key with the same code number is supplied and synchronized, the key already stored in the DAS control unit under this number will be automatically desynchronized.

**Note on model 163**

On vehicles produced before model year 2000, a new locking set (all locks, 2 keys and master key) and a new engine control unit must be ordered when all 8 keys have been used.

Additional information can be obtained from the diagnosis manuals, circuit diagram folders, WIS and the guided tests.

- It is important to ask the customer when the fault occurred and what effect it has. This allows you to rule out the possibility that more than one vehicle key is defective.
  Note that customers often forget that their second key is already defective.
- The diagnosis trees are based on the assumption that there is only one fault in the vehicle.
- In addition, the diagnosis trees assume that the vehicle battery and mechanical locking function are OK.
- Every key must always be checked for proper operation at every IR receiver (operation via IR).
- The radio remote control system can be disrupted by other radio transmitters. This may be the cause of the complaint "Radio remote control occasionally nonfunctional". For further information, see SI80.57-P-0002A.
- The IR remote control can be disrupted by other sources of light. This may be the cause of the complaint "IR remote control occasionally nonfunctional".

### Mechanical locking

If a new mechanical key does not work on a vehicle, its mechanical locking system does not match the locking system installed in the vehicle. Contact your national representative via Sorry-Web or XFS.

### Assignment of engine control unit to DAS control unit

The DAS control unit and engine control unit are permanently assigned to each other by means of an identification code. This identification cannot be erased. For this reason, it is not possible to swap the DAS control unit or engine control unit for a control unit from another vehicle for testing purposes.

# Key battery check/infrared test

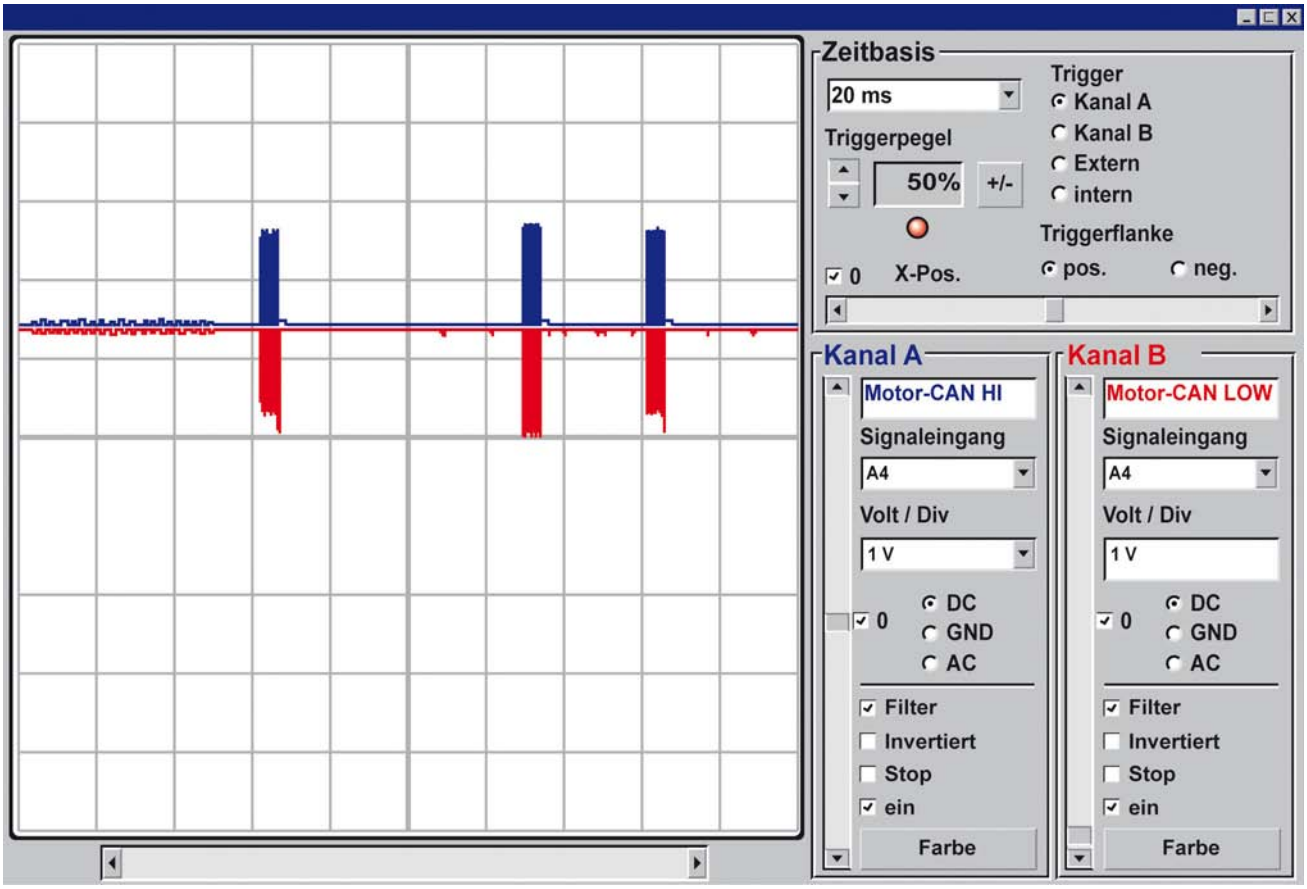
## Key battery check

If the lock / unlock button is pressed for more than one second and the battery indicator lamp on the key lights up briefly, this means that the batteries are OK.

## Infrared test

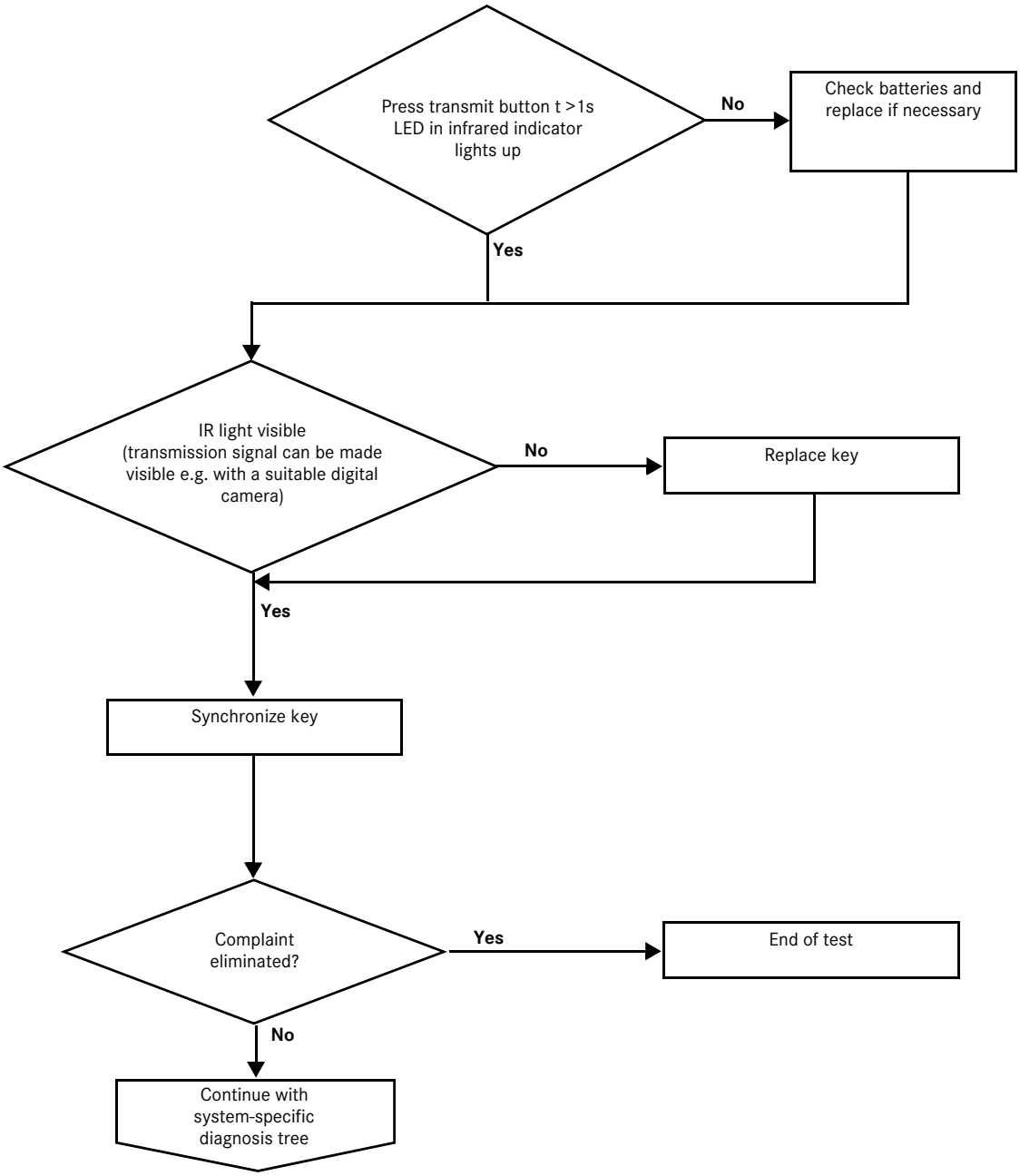
IR light can be made "visible" using a suitable digital camera or mobile phone with integrated camera. This cannot however reveal whether the coding is correct.

**Example of CAN signal between engine control unit and infrared remote central locking (IRCL) control unit**

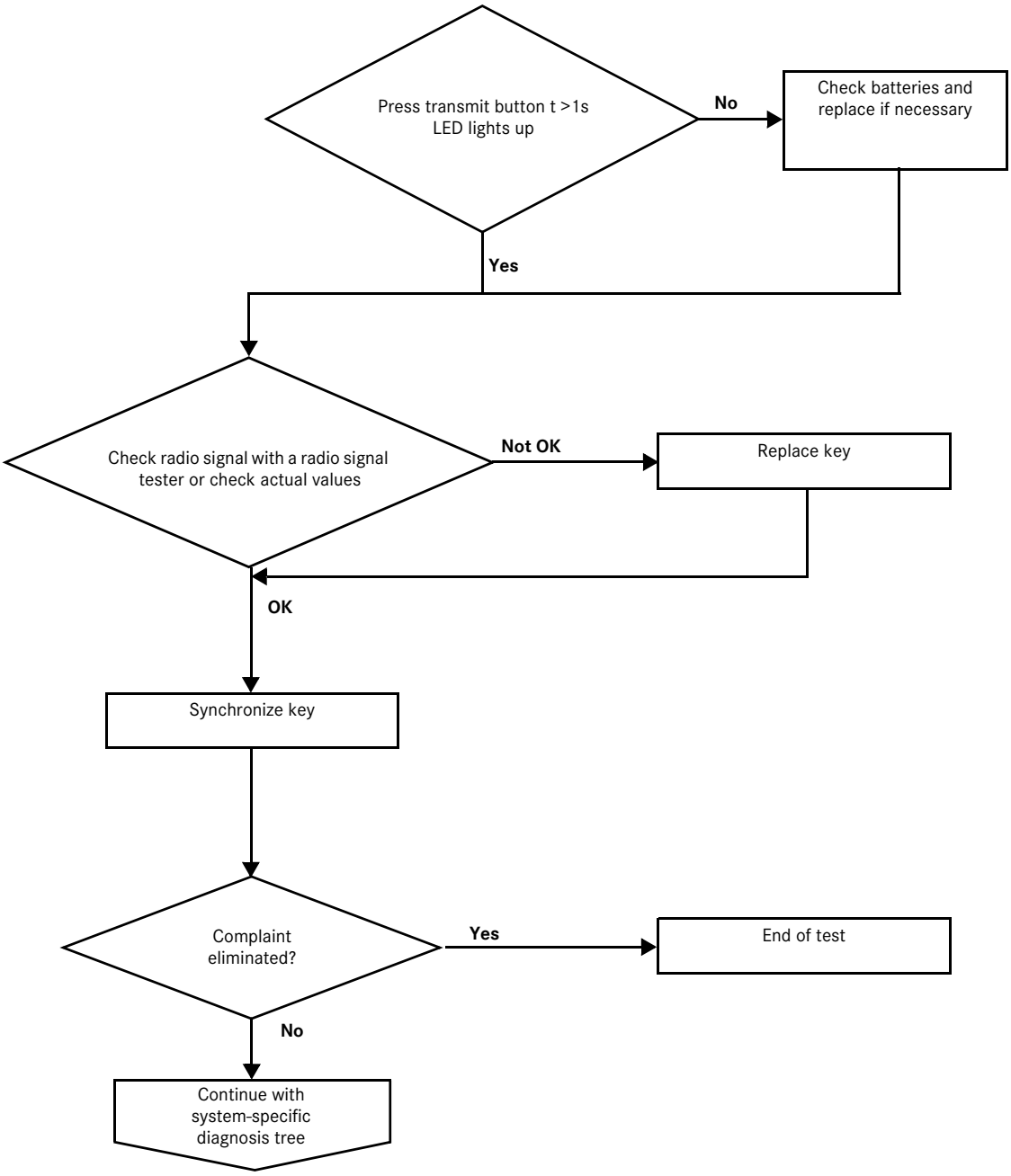



P80.57-2208-00

# Check IR remote control transmitter (DAS 1a - 2b)

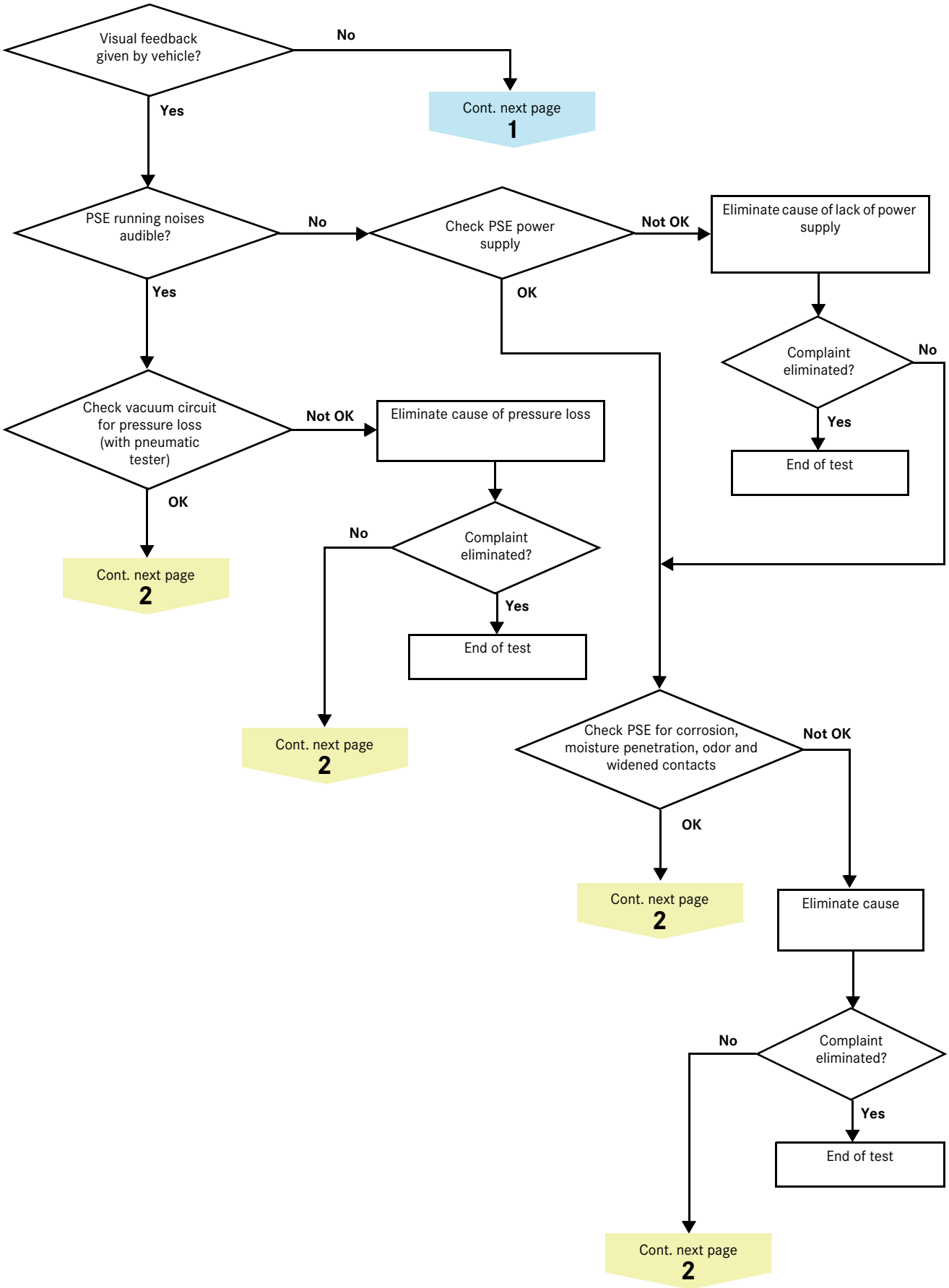


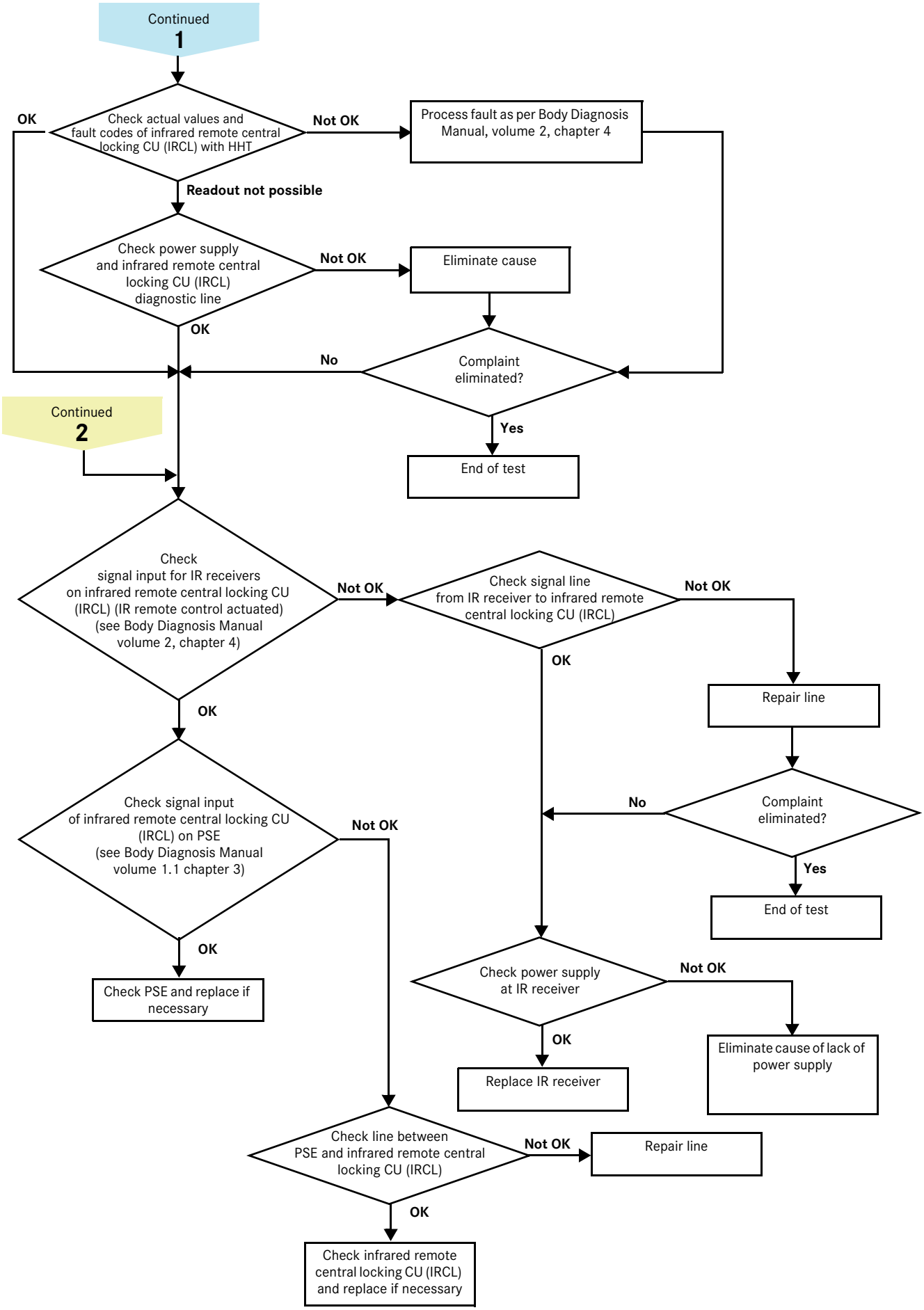
# Check radio remote control transmitter (DAS 2b)



# DAS 1a, 2, 2a, X and model 124

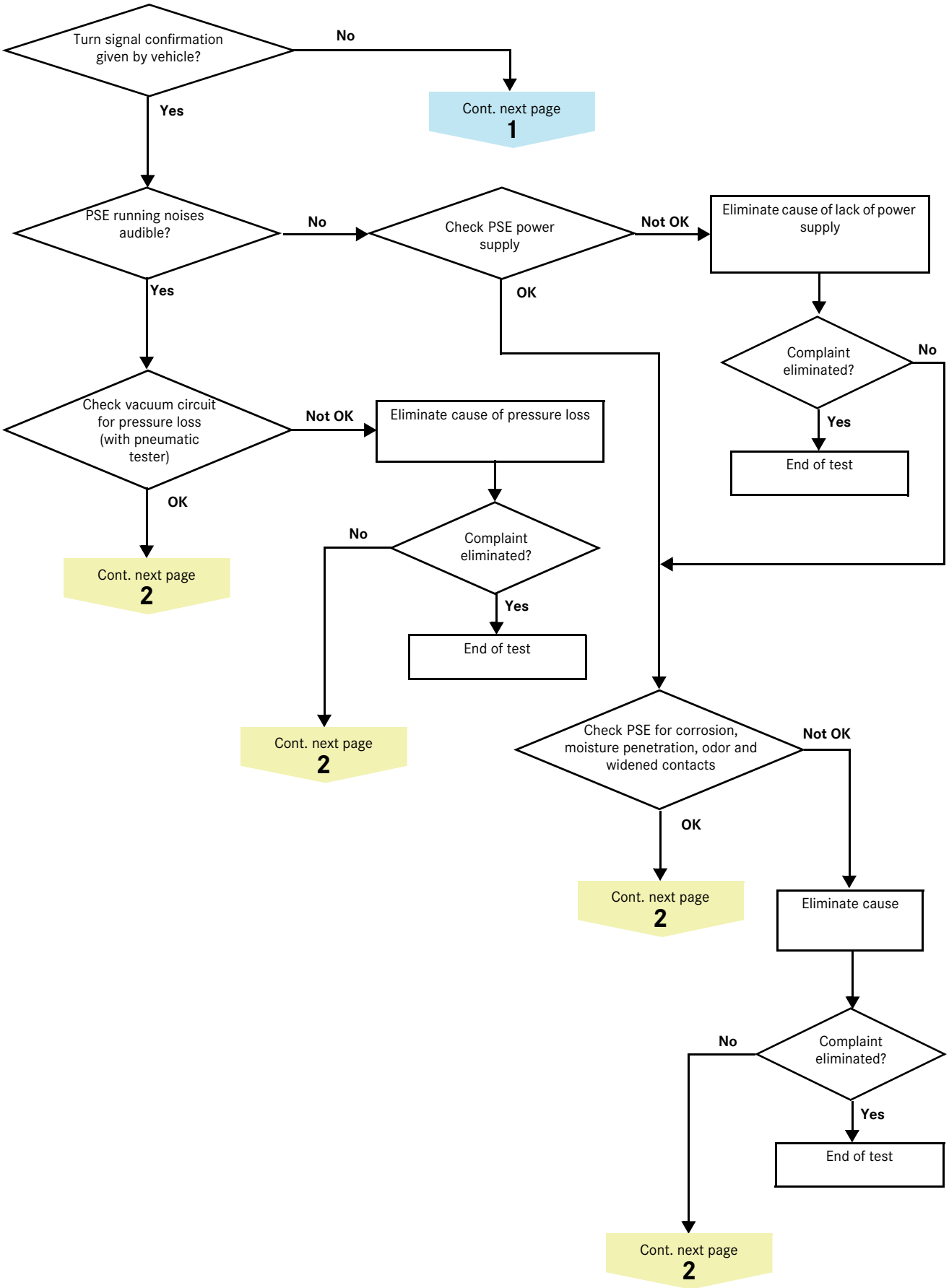
## Vehicle cannot be unlocked / locked via IR remote control

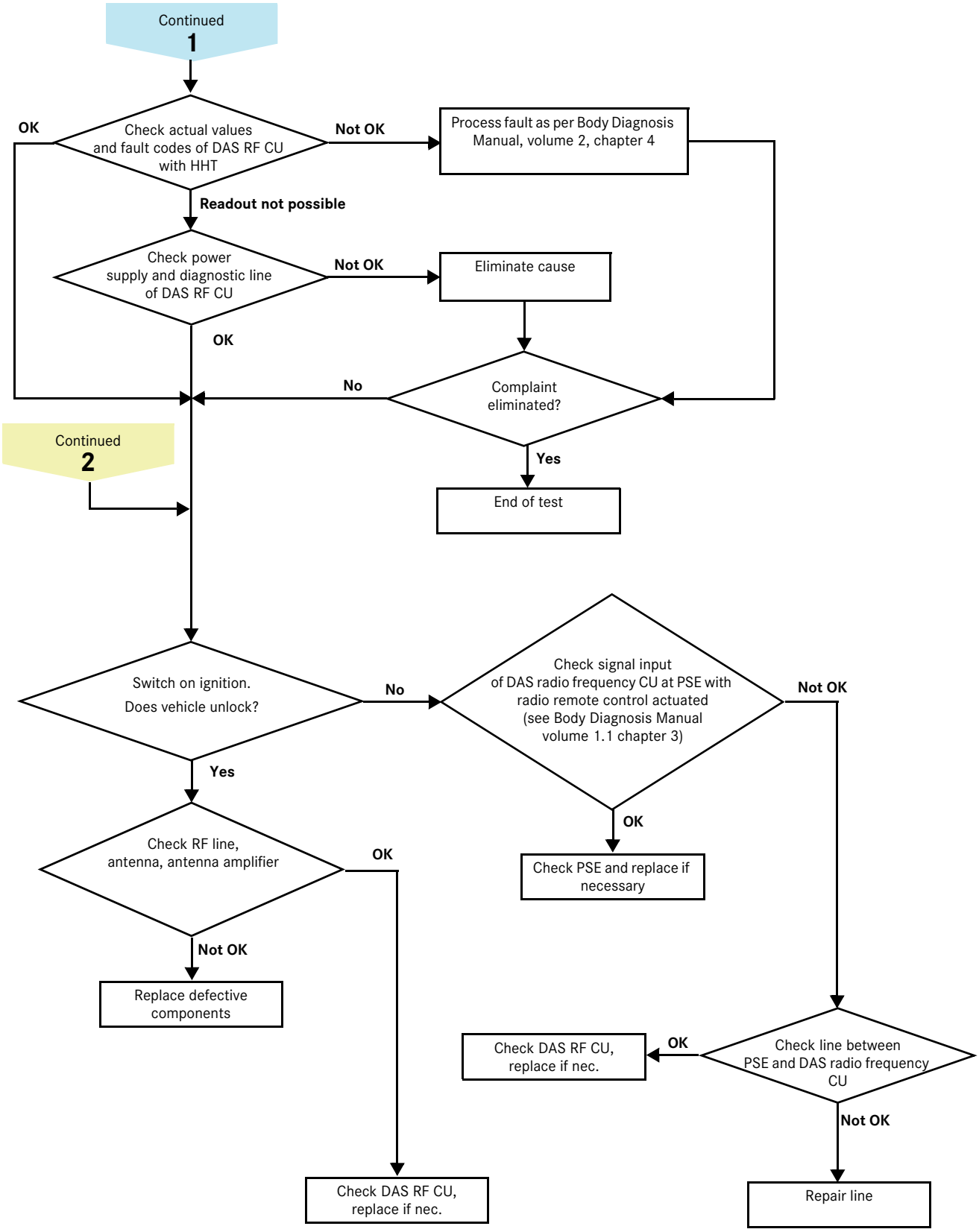




# DAS 2b

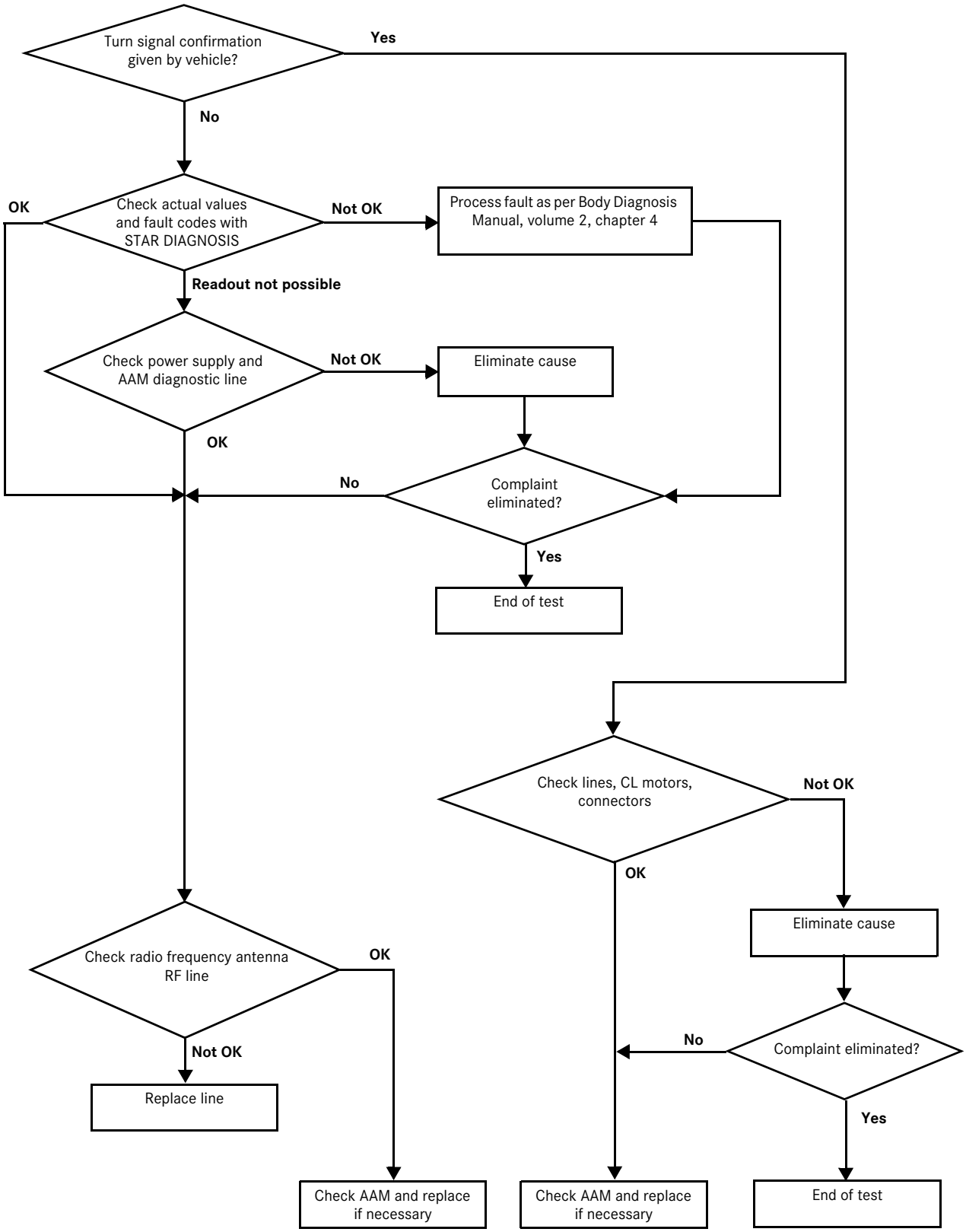
## Vehicle cannot be unlocked / locked via radio remote control



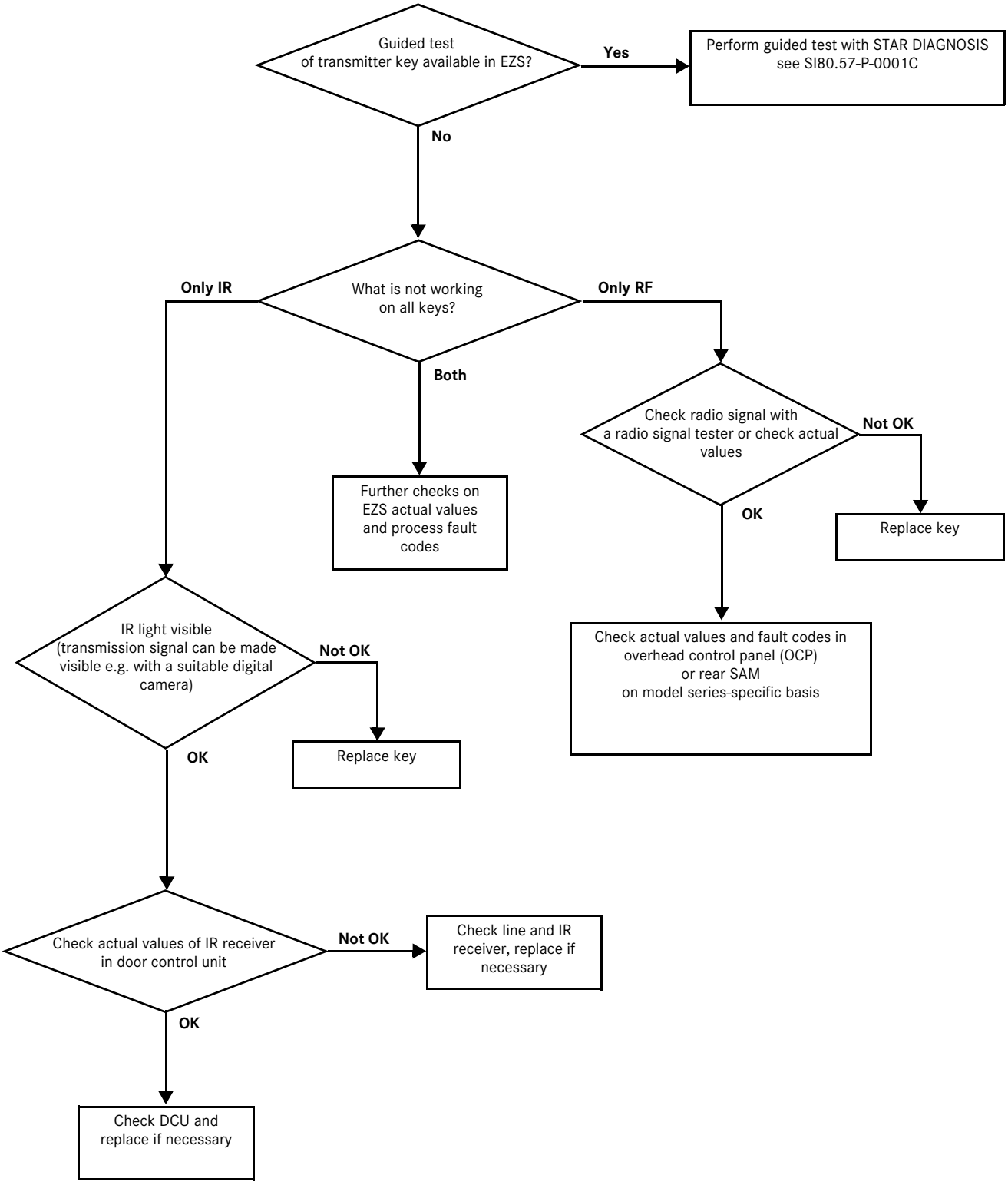


# DAS 2b on model 163

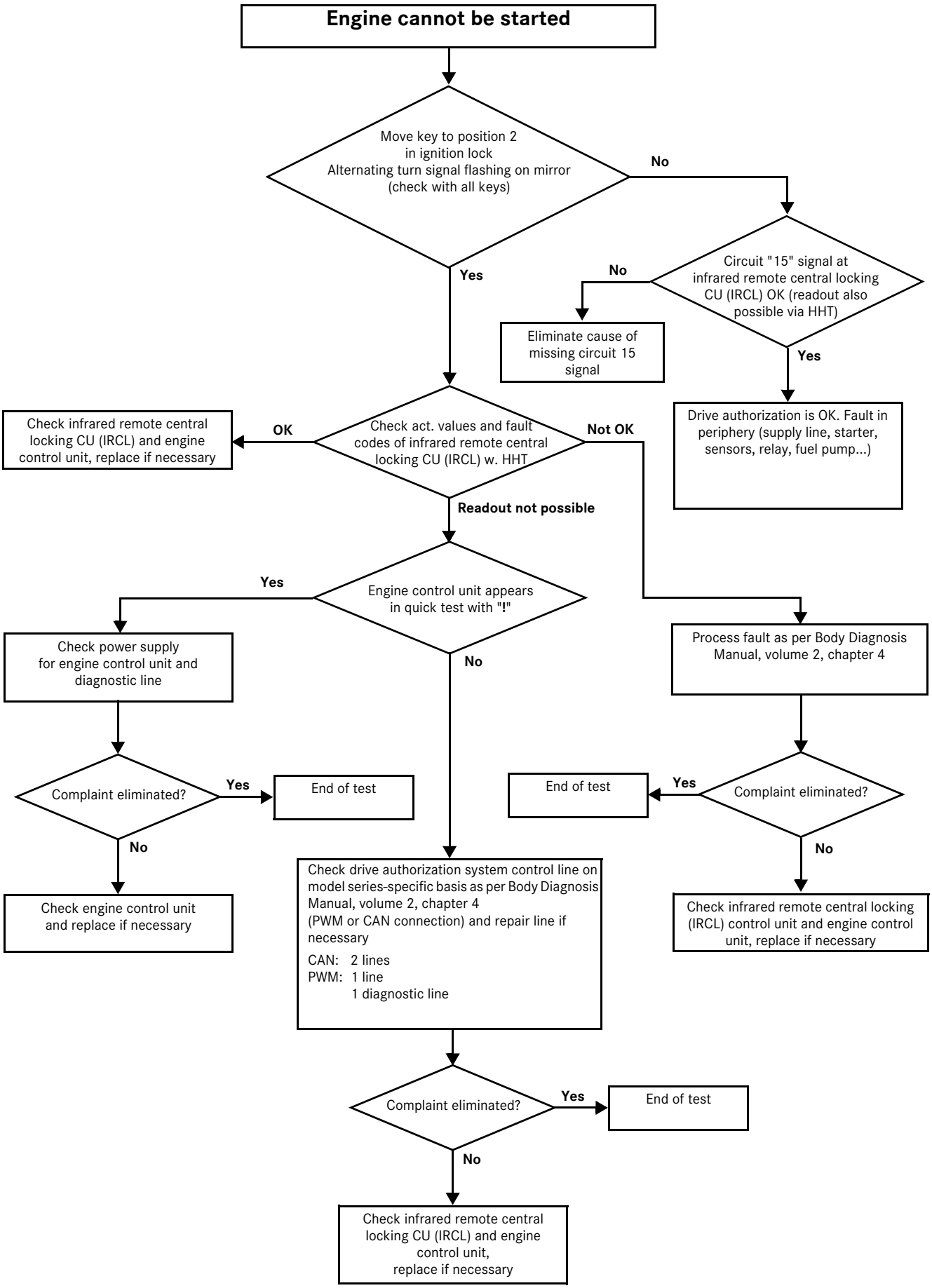
## Vehicle cannot be unlocked / locked via radio remote control

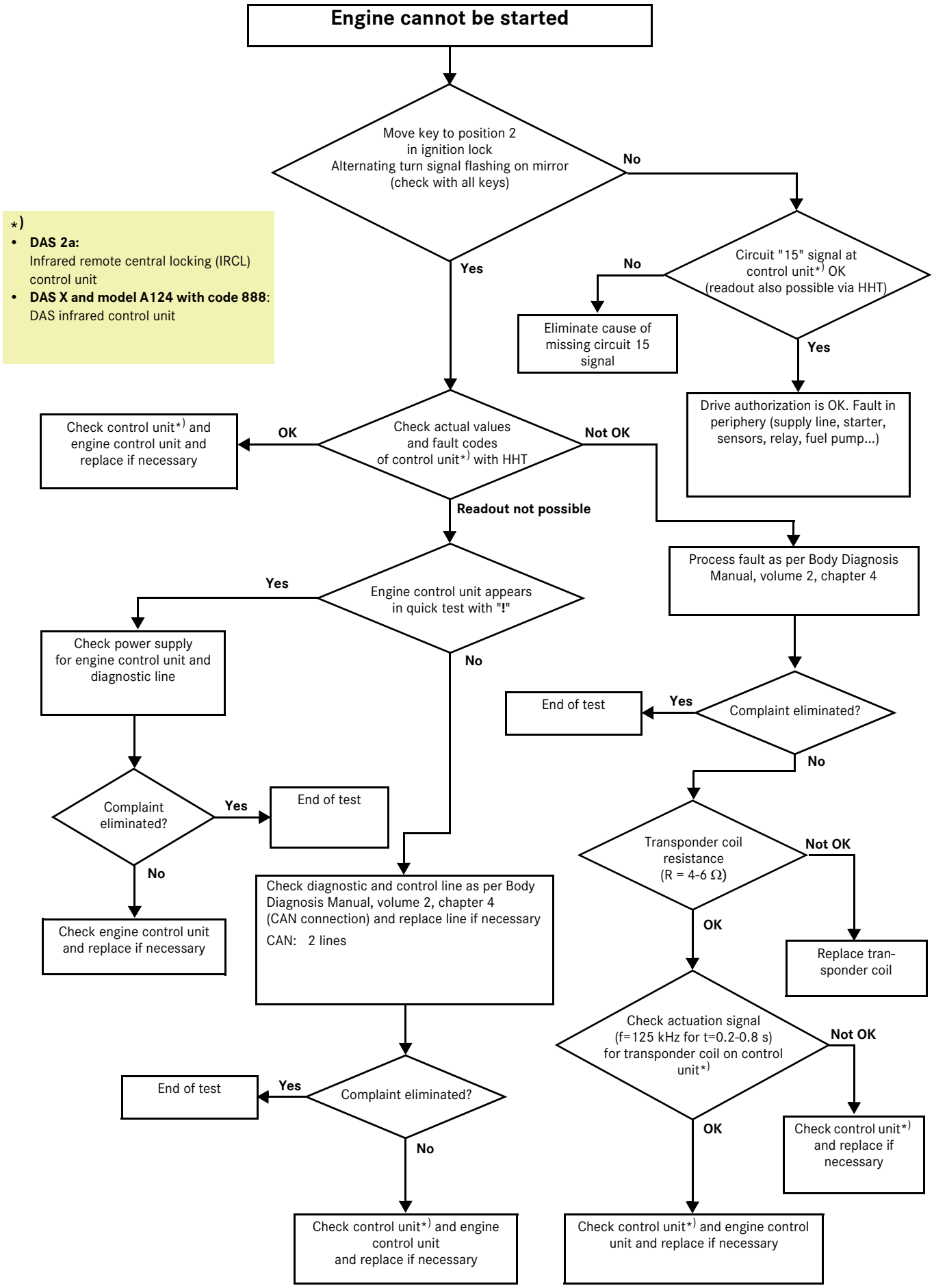


## Vehicle cannot be unlocked / locked via remote control



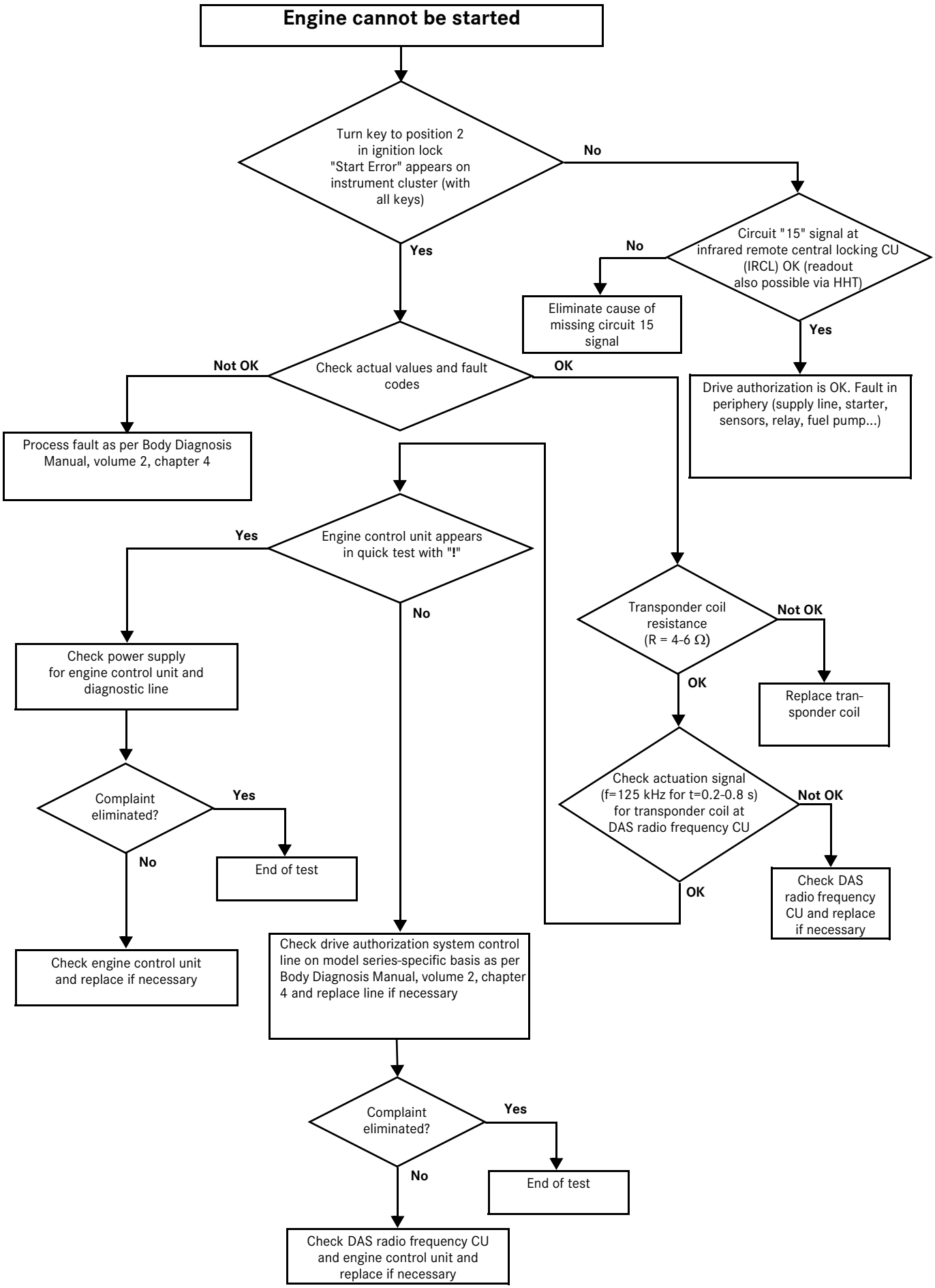
# DAS 2

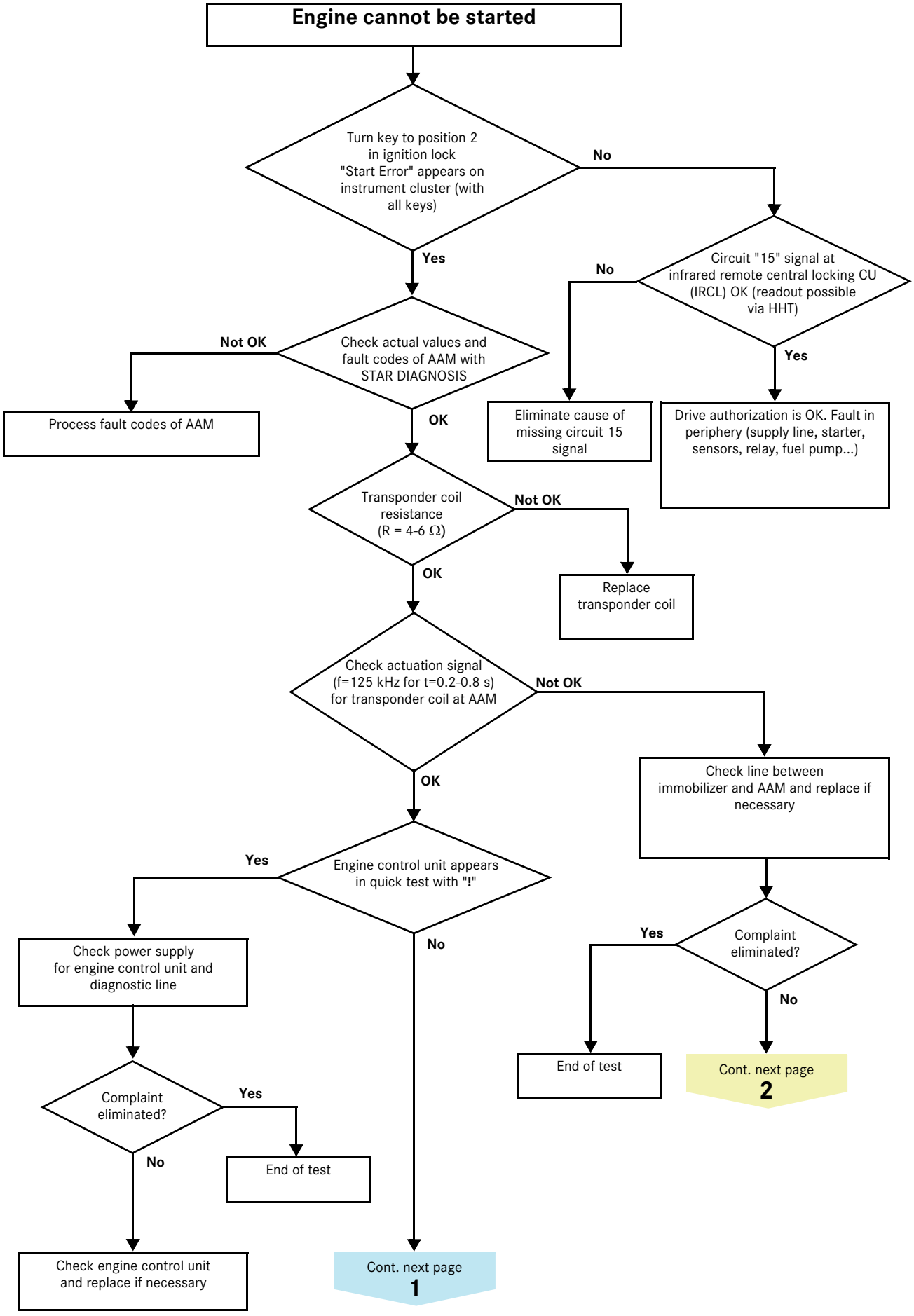

Engine cannot be started
Move key to position 2
in ignition lock
Alternating turn signal flashing on mirror
(check with all keys)
No
Yes
Circuit "15" signal at infrared remote central locking CU (IRCL) OK (readout also possible via HHT)
No
Yes
Eliminate cause of missing circuit 15 signal
Drive authorization is OK. Fault in periphery (supply line, starter, sensors, relay, fuel pump...)
Check act. values and fault codes of infrared remote central locking CU (IRCL) w. HHT
OK
Not OK
Check infrared remote central locking CU (IRCL) and engine control unit, replace if necessary
Readout not possible
Engine control unit appears in quick test with "!"
Yes
No
Check power supply for engine control unit and diagnostic line
Process fault as per Body Diagnosis Manual, volume 2, chapter 4
Complaint eliminated?
Yes
No
End of test
Check engine control unit and replace if necessary
End of test
Yes
Complaint eliminated?
No
Check infrared remote central locking (IRCL) control unit and engine control unit, replace if necessary
Check drive authorization system control line on model series-specific basis as per Body Diagnosis Manual, volume 2, chapter 4
(PWM or CAN connection) and repair line if necessary
CAN: 2 lines
PWM: 1 line
1 diagnostic line
Complaint eliminated?
Yes
No
End of test
Check infrared remote central locking CU (IRCL) and engine control unit,
replace if necessary



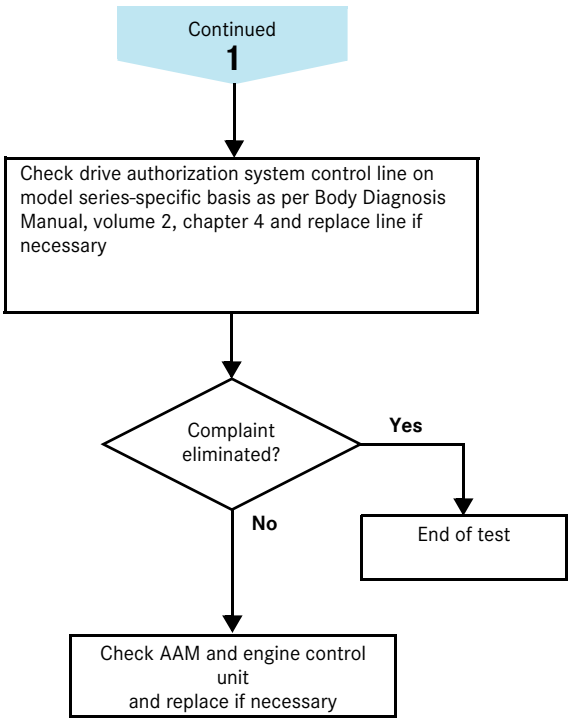

*)
- **DAS 2a:**
  Infrared remote central locking (IRCL) control unit
- **DAS X and model A124 with code 888**:
  DAS infrared control unit

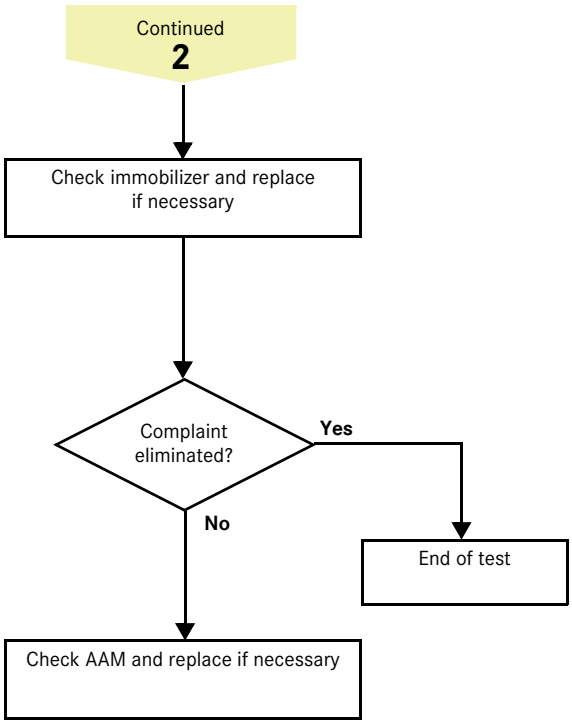
# DAS 2b

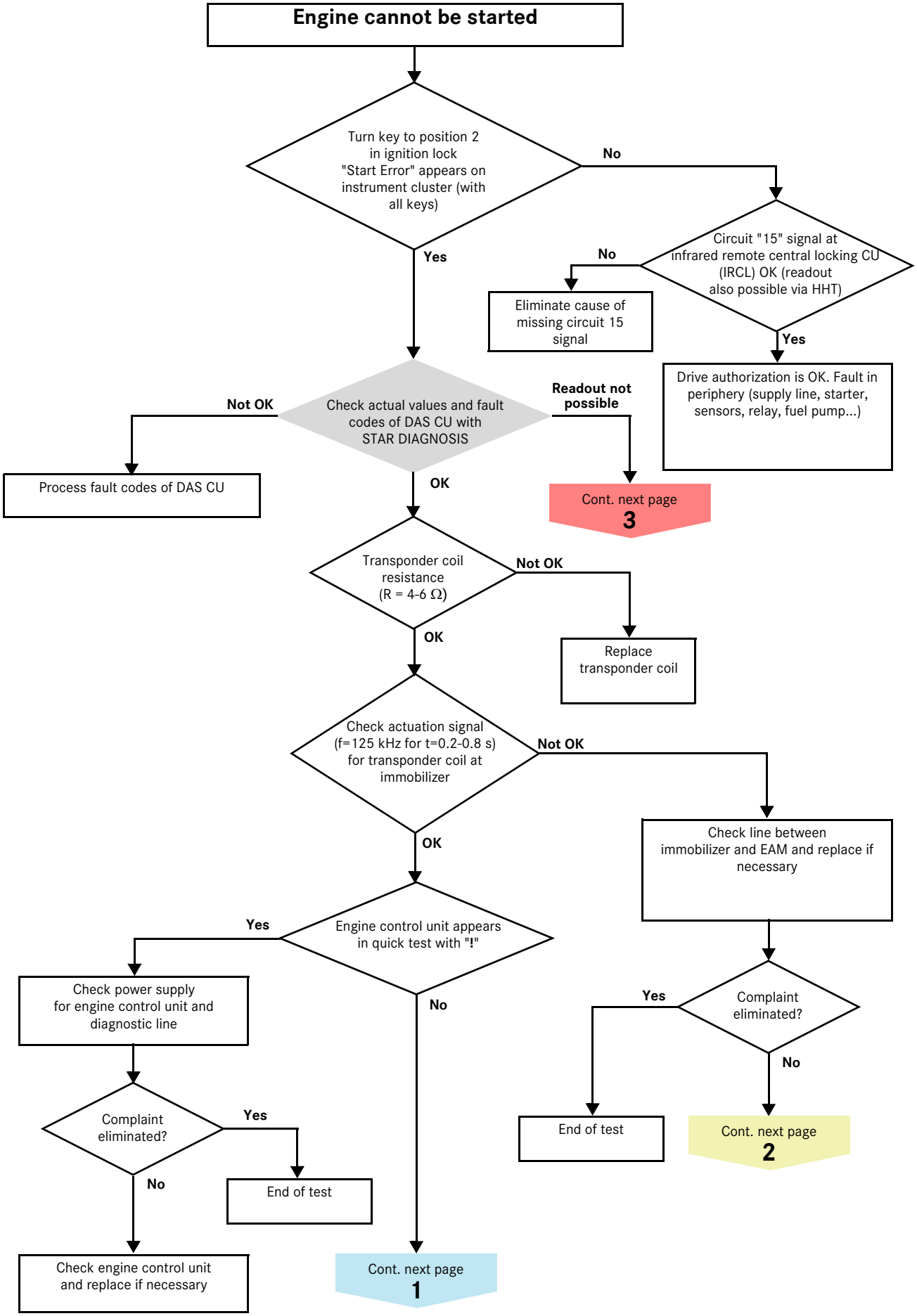

Engine cannot be started
Turn key to position 2 in ignition lock "Start Error" appears on instrument cluster (with all keys)
No
Yes
Circuit "15" signal at infrared remote central locking CU (IRCL) OK (readout also possible via HHT)
No
Yes
Eliminate cause of missing circuit 15 signal
Drive authorization is OK. Fault in periphery (supply line, starter, sensors, relay, fuel pump...)
Check actual values and fault codes
Not OK
OK
Process fault as per Body Diagnosis Manual, volume 2, chapter 4
Engine control unit appears in quick test with "!"
Yes
No
Check power supply for engine control unit and diagnostic line
Complaint eliminated?
Yes
No
End of test
Check engine control unit and replace if necessary
Check drive authorization system control line on model series-specific basis as per Body Diagnosis Manual, volume 2, chapter 4 and replace line if necessary
Complaint eliminated?
Yes
No
End of test
Check DAS radio frequency CU and engine control unit and replace if necessary
Transponder coil resistance (R = 4-6 Ω)
Not OK
OK
Replace transponder coil
Check actuation signal (f=125 kHz for t=0.2-0.8 s) for transponder coil at DAS radio frequency CU
Not OK
OK
Check DAS radio frequency CU and replace if necessary


Engine cannot be started
Turn key to position 2 in ignition lock "Start Error" appears on instrument cluster (with all keys)
No
Yes
Circuit "15" signal at infrared remote central locking CU (IRCL) OK (readout possible via HHT)
No
Yes
Check actual values and fault codes of AAM with STAR DIAGNOSIS
Not OK
OK
Process fault codes of AAM
Eliminate cause of missing circuit 15 signal
Drive authorization is OK. Fault in periphery (supply line, starter, sensors, relay, fuel pump...)
Transponder coil resistance (R = 4-6 Ω)
Not OK
OK
Replace transponder coil
Check actuation signal (f=125 kHz for t=0.2-0.8 s) for transponder coil at AAM
Not OK
OK
Check line between immobilizer and AAM and replace if necessary
Engine control unit appears in quick test with "!"
Yes
No
Check power supply for engine control unit and diagnostic line
Complaint eliminated?
Yes
No
End of test
Cont. next page 2
Complaint eliminated?
Yes
No
End of test
Check engine control unit and replace if necessary
Cont. next page 1

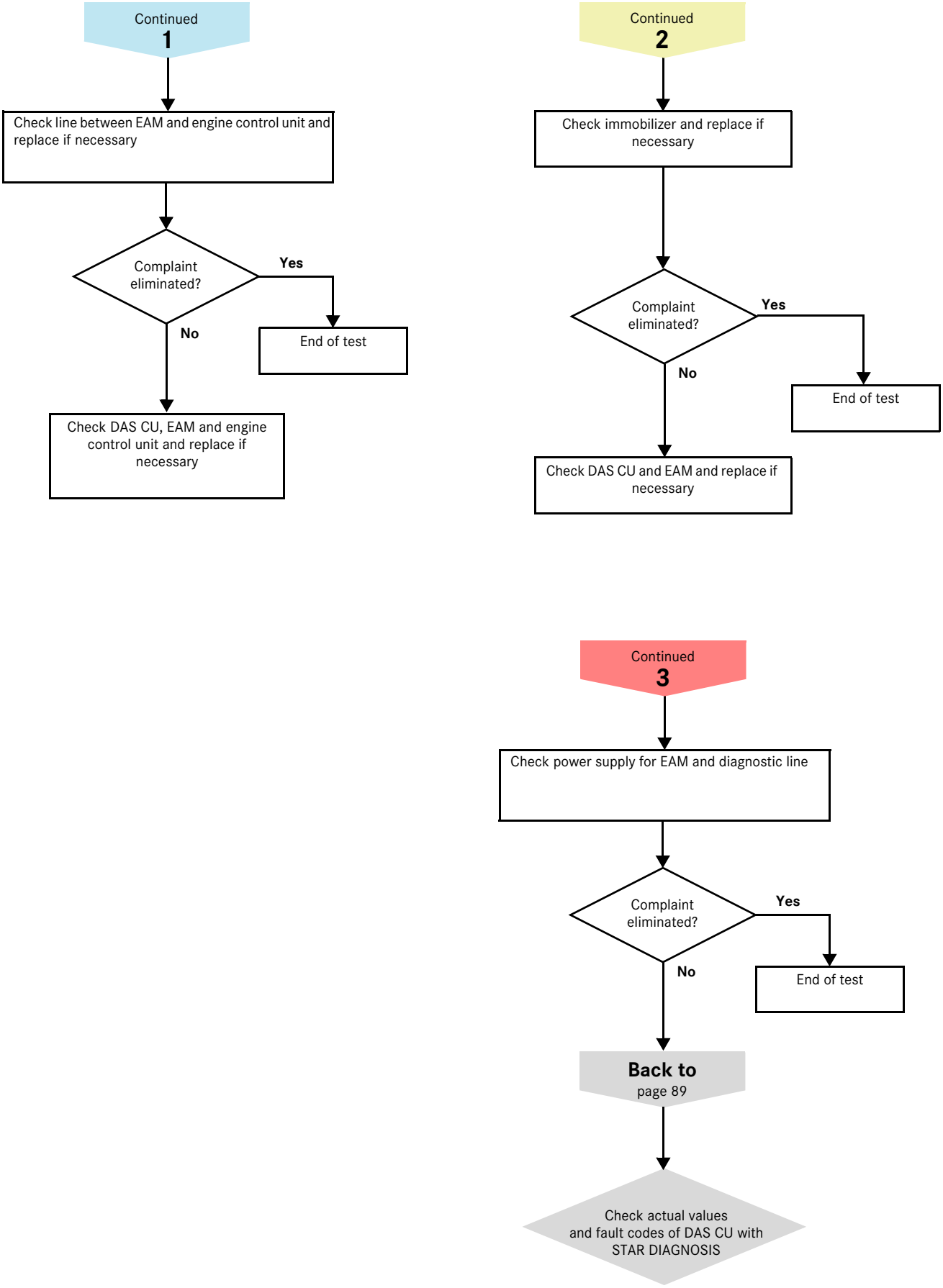
# DAS 2b on model 163 (market launch)

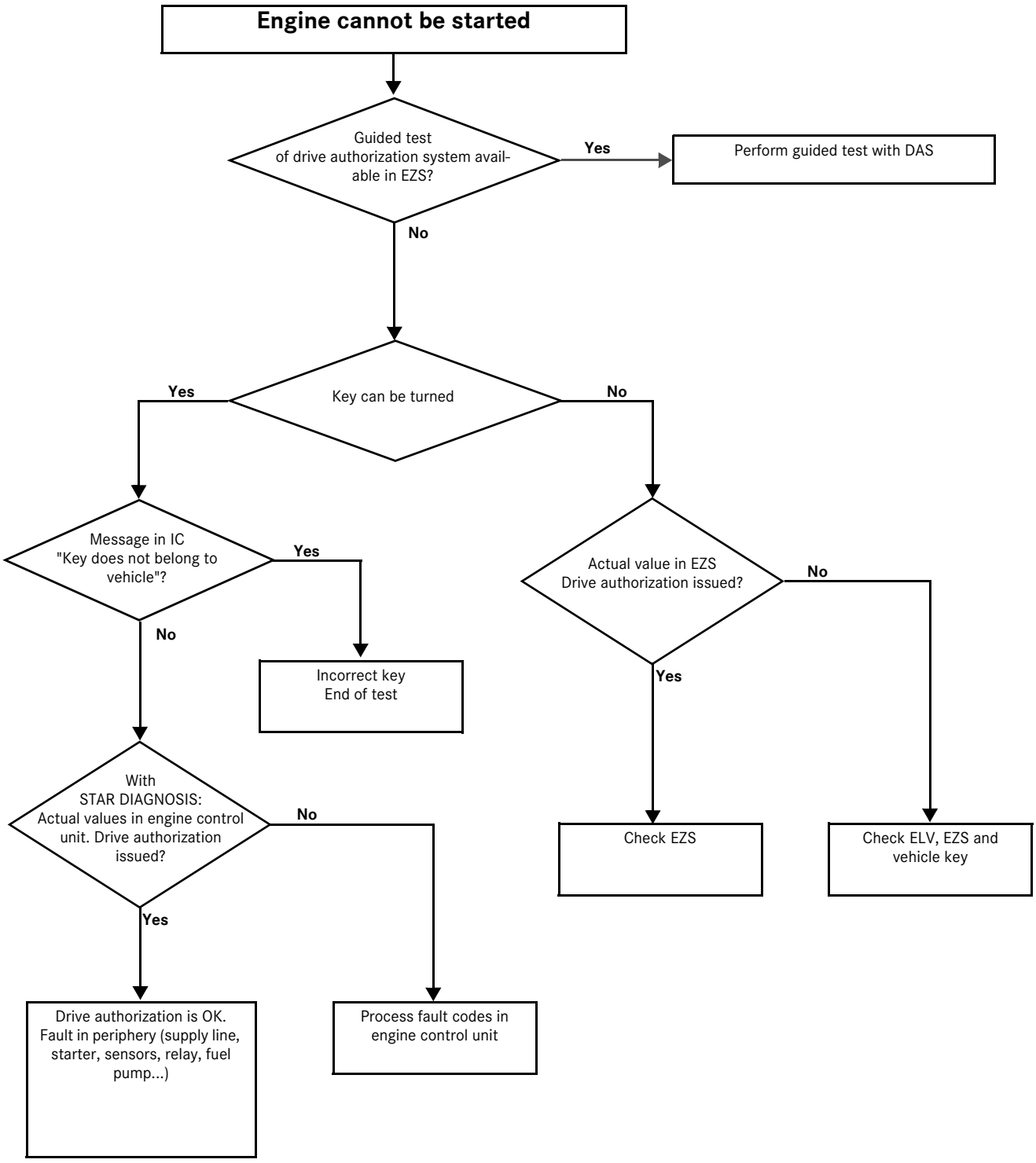




# DAS 2b on model 163 as of YoM 2000






**Note**

If the engine can be started but no gear range can be engaged, continue by checking ESM, ISM and transmission control unit

# Abbreviations

**AAM**

All Activity Module

**ASF**

Drive authorization system shutoff valve (DSV)

**CAN**

Controller Area Network

**DBE**

Overhead control panel (OCP)

**DRT**

Theft-relevant parts

**EAM**

Extended Activity Module

**EDW**

Anti-theft alarm system (ATA)

**EGS**

Electronic transmission control (ETC)

**ELV**

Electric steering lock

**ERE**

Electronic in-line injection pump

**ET**

Replacement part

**EVE**

Electronic distributor fuel injection pump

**EWM**

Electronic selector lever module (ESM)

**EZS**

Electronic ignition switch

**FBM**

Drive authorization module (DAM)

**FBS**

Drive authorization system (DAS)

**VIN**

Vehicle Identification Number

**HDF**

Trunk lid remote control

**HFM**

Hot film sequential multiport fuel injection / ignition system

**HHT**

Handheld tester

**Hz**

Hertz

**IFZ**

Infrared remote central locking (IRCL)

**OK**

OK

**IR**

Infrared

**ISM**

Intelligent Servo Module

**KG**

KEYLESS-GO

**LED**

Light Emitting Diode

**LH**

Mass air flow measurement with heated wire

**ME**

Motor electronics (ME-SFI)

**M / RSF**

Mechanically regulated in-line injection pump

**MSG**

Engine control unit (ECU)

**NAG2**

New automatic transmission, 2nd generation (NAT2)

**Pkw**

Passenger car

**PMS**

Pressurized engine control (PEC)

**PSE**

Pneumatic controller unit

**PWM**

Pulse Width Modulation

**SA**

Special equipment

**SAM**

Signal acquisition and actuation module

**SG**

Control unit (CU)

**SN**

Lock switch

**VeDOC**

Vehicle documentation system

**WIS**

Workshop Information System

**XSF**

Xentry Support and Feedback

**ZV**

Central locking (CL)

# Index

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