

## Technical product information

|                        |                                                     |
|------------------------|-----------------------------------------------------|
| <b>Topic</b>           | Bentayga - Stop Start System - Intermittent Failure |
| <b>Market area</b>     | Bentley: worldwide (2WBE),Hongkong-Macau (5HK)      |
| <b>Brand</b>           | Bentley                                             |
| <b>Transaction No.</b> | 2048860/1                                           |
| <b>Level</b>           | EH                                                  |
| <b>Status</b>          | Approval                                            |
| <b>Release date</b>    |                                                     |

### New customer code

| Object of complaint                                                                                                                | Complaint type                               | Position |
|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------|
| engine -> start/stop system -> engine stop by start/stop system                                                                    | functionality -> faulty                      |          |
| engine -> start/stop system -> engine start-up by start/stop system                                                                | functionality -> faulty                      |          |
| engine -> start/stop system -> engine stop by start/stop system                                                                    | functionality -> does not switch off         |          |
| engine -> start/stop system -> engine start-up by start/stop system                                                                | functionality -> without function / defect   |          |
| engine -> start/stop system -> engine start-up by start/stop system                                                                | functionality -> does not switch on          |          |
| engine -> start/stop system -> engine start-up by start/stop system                                                                | functionality -> does not switch off         |          |
| engine -> start/stop system -> engine stop by start/stop system -> engine stop start/stop system when neutral position is detected | functionality -> does not switch off         |          |
| information, navigation, communication, entertainment -> symbolic control indicators -> start/stop system indicator                | functionality -> activates                   |          |
| information, navigation, communication, entertainment -> symbolic control indicators -> start/stop system indicator                | functionality -> does not activate           |          |
| information, navigation, communication, entertainment -> symbolic control indicators -> start/stop system indicator                | functionality -> activates without reason    |          |
| information, navigation, communication, entertainment -> symbolic control indicators -> start/stop system indicator                | functionality -> does not switch off         |          |
| engine -> start/stop system -> engine stop by start/stop system                                                                    | functionality -> without function / defect   |          |
| engine -> start/stop system -> engine stop by start/stop system                                                                    | functionality -> defective function sequence |          |

### New workshop code

| Object of complaint                    | Complaint type                         | Position |
|----------------------------------------|----------------------------------------|----------|
| whole vehicle -> assemblies -> vehicle | concept -> functionality concept error |          |

## Vehicle data

### Bentayga

#### Sales types

| Type | MY   | Brand | Designation | Engine code | Gearbox code | Final drive code |
|------|------|-------|-------------|-------------|--------------|------------------|
| 4V1* | 2017 | E     |             | *           | *            | *                |
| 4V1* | 2018 | E     |             | *           | *            | *                |

#### Chassis numbers

| Manufacturer | Filler | Type | Filler | MY | Factory | From   | To     | Prod from | Prod to |
|--------------|--------|------|--------|----|---------|--------|--------|-----------|---------|
| SJA          | *      | *    | *      | *  | C       | 000001 | 999999 |           |         |

## Documents

| Document name                  |
|--------------------------------|
| <a href="#">master.xml</a>     |
| <a href="#">startstop.pdf</a>  |
| <a href="#">startstop.docx</a> |

## Customer statement / workshop findings

"Start/Stop" system intermittently fails to operate.

The engine does not always stop or start automatically.

The following symbol is displayed on Driver Instrument Panel.



No faults relating to the "Start/Stop" system are present.

## Technical background

There are a number of factors that prevent the "Start/Stop" system from automatically switching the engine off or on although the driver may expect it.

It is possible that the "Start/Stop" system may start the engine automatically although the driver may not expect it.

### Start Stop system Overview

The "Start-Stop" system can help to reduce fuel consumption and CO2 emissions.

The "Start-Stop" system is automatically activated with each ignition cycle and will switch off the engine automatically when the vehicle stops, e.g. at traffic lights.

The ignition remains on during this stop phase and the engine is automatically started on demand when the vehicle is ready to move off.

**For the Start-Stop system to function, the following basic conditions must be met:**

- The driver's door must be closed.
- The driver's safety belt must be fastened.
- The bonnet must be closed.
- The vehicle must have been moving at over 2 mph (4 km/h) since the last stop.
- The automatic gearbox must be in **D**-Drive, **N**-Neutral or **P**-Park.

The "Start-Stop" system is **not** available when any of the following Drive Dynamics modes have been selected: Sport, Snow & Grass, Dirt & Gravel, Mud & Trail, Sand.

The "Start-Stop" system may also be inactive when the **Custom** profile has been selected, depending upon the settings applied to the **Custom** profile.

The "Start-Stop" system will be deactivated if any of the following occur: Hill Descent Control, Electronic Stability Control (ESC) or All-Terrain mode are activated, also when the Electronic Stability Control (ESC) system is switched off.

The "Start-Stop" will only be active if the automatic gearbox is in **D**-Drive, **N**-Neutral, or **P**-Park.

The engine will start if the gear selector lever is moved to position **R**-Reverse during a stop phase.

It is possible to control whether or not the engine is switched off automatically by varying the amount of pressure on the brake pedal. For instance, when braking gently in stop-and-go traffic, the engine will remain on while the vehicle is at a standstill. As soon as the brake pedal is pressed harder, the engine will switch off.

The "Start-Stop" feature can start the engine if you leave the vehicle during a stop phase, provided you have left the vehicle for less than 30 seconds, and the following conditions have been met:

- The driver's door is closed, the driver's safety belt is fastened and the brake pedal is depressed,
- or:
- The driver's door is closed, the brake pedal is depressed and a gear is engaged.
- Depress the brake pedal during a stop phase to prevent the vehicle from moving.
- If the engine "Start/Stop" button is pressed during a stop phase, the ignition will be switched off.

### System limitations

The "Start-Stop" feature will behave differently depending upon the operating conditions of the vehicle.



If the symbol is shown one or more of the following may apply.

- The engine has not reached the minimum temperature required for the Start-Stop system to operate.
- The temperature selected on the climate control system has not been reached.
- The exterior temperature is very high or low.
- The windscreen is being defrosted.
- The Park Assist function is switched on.
- The battery charge is too low.

- The steering wheel is close to full lock or the vehicle is being steered.
- **R**-Reverse has been selected.
- The vehicle is on a steep gradient.
- The vehicle is at high altitude.

The engine will start automatically during a stop phase if:

- The vehicle starts to roll (e.g. on a steep gradient).
- The interior temperature deviates from the climate control system setting.
- The windscreen is being defrosted.
- The brake pedal is pressed several times in succession.
- The battery charge drops to an insufficient level.
- Electrical power consumption is high.

The engine will switch off when the conditions for Start-Stop mode are met.

To prevent the battery from being discharged, the ignition will be switched off automatically if:

- The Start-Stop system has switched off the engine,

and:

- The vehicle is stationary,

and:

- The driver has left the vehicle and the engine has not been restarted within approximately 30 seconds.

The message "Ignition will be switched off automatically" will be displayed in the driver instrument panel and the side lights will be switched on instead of the dipped headlights.

After approximately 30 minutes, or when the vehicle is locked, the side lights will be switched off.

The ignition is also switched off if the vehicle is locked from the outside during a stop phase. If the Start-Stop system has not stopped the engine or if you have switched off the Start-Stop system manually, the engine will continue running and the ignition will not be switched off automatically.

### **Important**

If **D**-Drive or **N**-Neutral are selected after selecting **R**-Reverse, the vehicle must have been moving at over 6 mph (10 km/h) before the system can switch off the engine again.

Although the engine is switched off shortly before the vehicle comes to a halt, the foot brake servo and power steering will still function.

### **Production change**

Not applicable.

### **Measure**

With a Customer complaint of incorrect "Start/Stop" functionality, use Guided Fault Finding to interrogate for Diagnostic Trouble Codes (DTC's) or any concern that may be influencing the "Start/Stop" system.

If relevant DTC's are not present and there are no other factors stopping the "Stop/Start" system from operating correctly, then the customer should be informed that the "Stop/Start" system is operating correctly, any variation in "Start/Stop" operation is due to the complex nature of the system and conditions that may affect its functionality.

A comprehensive list showing the various systems that may influence the "Start/Stop" system is attached.

## Explanatory notes on history entries of the active devices

### 01 - Engine Electronics

#### Start requests

| Reason                             | Cause:                                                                                                                                                                                            | Handling                                                                                                                                                |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Engine temperature too low         | The engine temperature fell too low                                                                                                                                                               | Advise the customer that this will help protect the engine                                                                                              |
| Engine temperature too high        | The engine temperature rose too high                                                                                                                                                              | Advise the customer that this will help protect the engine                                                                                              |
| Brake vacuum too low               | Pressure in brake servo unit too low, engine is started to boost the braking power                                                                                                                | Advise the customer that this will improve safety                                                                                                       |
| Immobilizer requests restart       | It was detected that the key is moving away from the vehicle                                                                                                                                      | Advise the customer that this will improve safety                                                                                                       |
| SCR System requires restart        | The temperature of one or more component(s) of the SCR catalytic converter system is/are outside the regular operating range.                                                                     | Advise the customer that the operational readiness of emissions-related components must always be ensured as a legal requirement.                       |
| Engine hood open                   | Engine hood open                                                                                                                                                                                  | Advise the customer that start/stop is disabled for his safety when the bonnet is open (also in hybrid vehicle).                                        |
| Steering                           | Steering wheel is permanently in motion while the driver comes to a stop and presses the brake with sufficient force (stop request)                                                               | Advise the customer that for the engine to be stopped the steering wheel must not be moving, because the steering assistance then has to be maintained. |
| Rolling vehicle                    | To provide the ancillary units (e.g. brake servo unit) with mechanical energy, the engines of vehicles with start/stop must always be on.                                                         | The vehicle will have no brake servo assist, for example, if running without the combustion engine.                                                     |
| Auxiliary consumers power too high | Various influences (temperature/loading by operation points) might cause the ancillary consumers to develop an increased power demand which can/should no longer be covered by the battery alone. | All comfort functions provided by the ancillary consumers need to be maintained for the customer.                                                       |
| Hybrid battery power insufficient  | Various influences (temperature/loading by operation points) might restrict the battery's capability to self-protect its power capacity.                                                          | Advise the customer that this protects the battery.                                                                                                     |

|                                   |                                                                                                                                                                                                                                                                                  |                                                                                                                                   |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Deceleration takeover active      | If the battery is fully charged by a lengthy recuperation phase, for example, no more electric thrust (simulation of the combustion engine's thrust by the electric motor) can be set. To ensure a consistent driving feel, the engine is then activated and set at this thrust. | Advise the driver of this comfort feature. The vehicle would otherwise disable "engine braking" when driving downhill.            |
| Motor protection active           | The engine must be run at certain interval for a defined time in order to protect the engine components.                                                                                                                                                                         | Advise the customer that this protects the engine components.                                                                     |
| Fuel clogging protection active   | To prevent the fuel from clogging, due to inappropriate consistency (cold), the fuel must be used up and intermingled with topped-up fuel.                                                                                                                                       | Advise the customer that this protects the engine components and vehicle.                                                         |
| Cat. heater                       | The temperature of one or more component(s) of the catalytic converter system is/are outside the regular operating range.                                                                                                                                                        | Advise the customer that the operational readiness of emissions-related components must always be ensured as a legal requirement. |
| Intermittent function restriction | The engine needs to be running for adaptations and diagnostics, as well as for component protection                                                                                                                                                                              | Advise the customer that for safe execution the engine must not be stopped.                                                       |
| Restriction in start system       | .                                                                                                                                                                                                                                                                                | .                                                                                                                                 |

### Stop prohibitions

| Reason                                                         | Cause:                                                                                 | Handling                                                    |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------|
| Ambient air density/Ambient air pressure                       | Ambient air density outside nominal range                                              | Advise the customer that this will help protect the engine  |
| Brake vacuum / Brake vacuum too low                            | Pressure in brake servo unit too low, engine must remain on to boost the braking power | Advise the customer that this will improve safety           |
| Intermittent function restriction                              | One of the following reasons occurred:                                                 | Advise the customer that this will improve safety           |
|                                                                | Starter control sends stop prohibition                                                 |                                                             |
|                                                                | Neutral not plausibility-checked                                                       |                                                             |
|                                                                | Immobilizer active                                                                     |                                                             |
|                                                                | Special speed controller                                                               |                                                             |
| Bad start detection / Bad start detection from starter control | The restart took too long                                                              | Work through the relevant test plan                         |
| Regeneration operation                                         | One of the following diesel exhaust components is in                                   | Advise the customer that this action deactivates the start- |

|                                           |                                                                                                                                     |                                                                                                                                                          |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                           | regeneration mode:                                                                                                                  | stop function. Make frequent trips to burn free the filter                                                                                               |
|                                           | Diesel particle filter                                                                                                              |                                                                                                                                                          |
|                                           | SCR system                                                                                                                          |                                                                                                                                                          |
|                                           | NOx storage cat                                                                                                                     |                                                                                                                                                          |
| Mixture adaption                          | To balance out drift over the service life in the fuel metering system, the system auto-adapts.                                     | Advise the customer that the purpose of mixture adaption is to ensure consistently safe and comfortable running of the engine.                           |
| Engine temperature too low                | One or more engine component(s) is/are outside the regular operating range.                                                         | Advise the customer that this will help protect the engine                                                                                               |
| Engine temperature too high               | One or more engine component(s) is/are outside the regular operating range.                                                         | Advise the customer that this will help protect the engine                                                                                               |
| SCR System requires restart               | The temperature of one or more component(s) of the SCR catalytic converter system is/are outside the regular operating range.       | Advise the customer that the operational readiness of emissions-related components must always be ensured as a legal requirement.                        |
| Engine hood open                          | Engine hood open                                                                                                                    | Advise the customer that start/stop is disabled for his safety when the bonnet is open.                                                                  |
| Steering                                  | Steering wheel is permanently in motion while the driver comes to a stop and presses the brake with sufficient force (stop request) | Advise the customer that for the engine to be stopped the steering wheel must not be moving, because the steering assistance then has to be maintained.  |
| Steering angle                            | Steering angle too wide.                                                                                                            | Advise the customer that he must not turn the steering wheel to stop the engine. It is assumed that a turn is needed and the engine needs to be running. |
| Driving situation                         | Manoeuvring detection (R engaged) is active                                                                                         | Advise the customer that the system assumes the vehicle is manoeuvring (e.g. parking). This typically requires the engine to be running.                 |
| Play protection                           | Too many engine starts in a standstill phase were requested.                                                                        | Advise the customer that, for comfort reasons, the engine prevents stopping after repeated starts in a standstill phase.                                 |
| Function locked due to excessive stalling | If excessively frequent stalling is detected, the coordinator                                                                       | Advise the customer that this will help protect the engine                                                                                               |

|                                       |                                                                                                                                                                                                   |                                                                                                                |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
|                                       | disables start/stop mode in order to protect components                                                                                                                                           |                                                                                                                |
| Brake pedal information, plausibility | This function checks the brake pedal sender for a plausible signal.                                                                                                                               | Advise the driver that he must have pressed and released the brake pedal once before the first stop.           |
| Tighter traffic flow detected         | The vehicle detects slow-moving traffic (frequent stops at low speed) and enforces a stop prohibition to prevent short stops.                                                                     | Advise the driver of this comfort feature                                                                      |
| E machine, output too low             | Various influences (temperature/loading by operation points) might restrict the electric motor's capability to self-protect its power capacity                                                    | Advise the customer that this protects the electric motor.                                                     |
| Rolling vehicle                       | To provide the ancillary units (e.g. brake servo unit) with mechanical energy, the engines of vehicles with start/stop must always be on.                                                         | The vehicle will have no brake servo assist, for example, if running without the combustion engine.            |
| Clutch protection K0                  | In some situations the separating clutch must be closed for its own protection, necessitating running of the engine.                                                                              | Advise the customer that this protects the separating clutch between the combustion engine and electric motor. |
| Auxiliary consumers power too high    | Various influences (temperature/loading by operation points) might cause the ancillary consumers to develop an increased power demand which can/should no longer be covered by the battery alone. | All comfort functions provided by the ancillary consumers need to be maintained for the customer.              |
| Adaption active                       | For legal reasons, and for component protection, some engine functions must be regularly adapted. They 'relearn' or enhance the ambient conditions for fault-free running.                        | Advise the customer that this aids fault-free running of the combustion engine.                                |
| Hybrid battery power insufficient     | Various influences (temperature/loading by operation points) might restrict the battery's capability to self-protect its power capacity.                                                          | Advise the customer that this protects the battery.                                                            |

|                                             |                                                                                                                                                                                                                                                                                  |                                                                                                                                   |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Deceleration takeover active                | If the battery is fully charged by a lengthy recuperation phase, for example, no more electric thrust (simulation of the combustion engine's thrust by the electric motor) can be set. To ensure a consistent driving feel, the engine is then activated and set at this thrust. | Advise the driver of this comfort feature. The vehicle would otherwise disable "engine braking" when driving downhill.            |
| Motor protection active                     | The engine must be run at certain interval for a defined time in order to protect the engine components.                                                                                                                                                                         | Advise the customer that this protects the engine components.                                                                     |
| Fuel clogging protection active             | To prevent the fuel from clogging, due to inappropriate consistency (cold), the fuel must be used up and intermingled with topped-up fuel.                                                                                                                                       | Advise the customer that this protects the engine components and vehicle.                                                         |
| Exhaust system diagnosis                    | A component of the exhaust system requires a defined temperature/exhaust gas flow for self-diagnosis.                                                                                                                                                                            | Advise the customer that for assured diagnosis the engine must not be stopped.                                                    |
| Exhaust emission control diagnosis          | A component of the exhaust gas cleaning system requires a defined temperature/exhaust gas flow for self-diagnosis.                                                                                                                                                               | Advise the customer that for assured diagnosis the engine must not be stopped.                                                    |
| Diagnosis of air system                     | A component of the air system in the engine requires a defined air flow/air pressure for self-diagnosis.                                                                                                                                                                         | Advise the customer that for assured diagnosis the engine must not be stopped.                                                    |
| Test of thermostat not complete             | A thermostat in the engine requires a defined temperature for self-diagnosis.                                                                                                                                                                                                    | Advise the customer that for assured diagnosis the engine must not be stopped.                                                    |
| Cat. heater                                 | The temperature of one or more component(s) of the catalytic converter system is/are outside the regular operating range.                                                                                                                                                        | Advise the customer that the operational readiness of emissions-related components must always be ensured as a legal requirement. |
| Intermittent function restriction           | The engine needs to be running for adaptations and diagnostics, as well as for component protection                                                                                                                                                                              | Advise the customer that for safe execution the engine must not be stopped.                                                       |
| Event memory entry in engine control module | .                                                                                                                                                                                                                                                                                | .                                                                                                                                 |
| Restriction in start system                 | .                                                                                                                                                                                                                                                                                | .                                                                                                                                 |

## Start prevention

| Reason                                    | Cause:                                                                                                                | Handling                                                                                                         |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Engine hood open                          | Engine hood open                                                                                                      | Advise the customer that start/stop is disabled for his safety when the bonnet is open (also in hybrid vehicle). |
| Function locked due to excessive stalling | If excessively frequent stalling is detected, the coordinator disables start/stop mode in order to protect components | Advise the customer that this will help protect the engine                                                       |
| Brake pedal information, plausibility     | Start prohibition due to lack of brake plausibility.                                                                  | As long as the brake has not yet been initialised, starting of the combustion engine is inhibited.               |

## 02 - Gearbox electronics

### Start requests

| Reason                                          | Cause:                                                                                        | Handling                                                                                             |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Driver intention                                | Gear P engaged; P can only be disengaged when engine running (oil pressure)                   | Advise the customer that placing the selector lever in P starts the engine.                          |
| Vehicle speed too high                          | Without the engine running, the necessary lubrication of the gearbox is lacking at high speed | Advise the customer that at high speed the engine must be running in order to lubricate the gearbox. |
| Auxiliary hydraulic pump for transmission error | The gear oil auxiliary hydraulic pump has a malfunction.                                      | Check gear oil auxiliary hydraulic pump by final control diagnosis and repair possible faults.       |

### Stop prohibitions

| Reason                                  | Cause:                                                                                                                                                                              | Handling                                                                                  |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Temperature condition not met           | The gear oil temperature was below -10°C                                                                                                                                            | Advise the customer that at very low temperatures the gearbox needs to be warmed up first |
| Pressure sensor failure                 | When the sensor fails, the hydraulic pump motor -V401 operates continuously providing hydraulic pressure; during the “stop phase” this would overload the vehicle electrical system | Repair gearbox                                                                            |
| Emergency running / Restricted function | In the event of a fault only a partial gearbox is used. So stop function cannot be                                                                                                  | Repair gearbox                                                                            |

|                                              |                                                                                                                            |                                                                                                                                                   |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
|                                              | implemented                                                                                                                |                                                                                                                                                   |
| Software/application error                   | Data record error, stop function permanently off                                                                           | Check software version (SVM)                                                                                                                      |
| Gear actuator in wrong position              | While the gear actuator is being moved to the correct position, the engine must be running to maintain the pressure supply | Inform the customer that improper motions on the selector lever and result in unnecessary gear selector motions                                   |
| Transmission fluid temperature too high      | Excessive gear oil temperature permits no stop function                                                                    | Advise the customer that if the gearbox is overheated the stop function is not possible                                                           |
| Adaption procedure active                    | The mechatronics unit is continuously being adapted in operation                                                           | Advise the customer that the gearbox continuously improves its gear-shifting comfort autonomously, and in this cycle the engine cannot be stopped |
| Brake acceleration too great                 | Excessive braking was applied in operation and the gear oil level has fallen                                               | Advise the customer that excessive braking may prevent an engine stop                                                                             |
| Pressure accumulator filling not completed   | Sufficient pressure has not been produced in the pressure accumulator for operation                                        | Advise the customer that the gearbox must build up pressure for restarting                                                                        |
| Oil temperature too low                      | Too low gear oil temperature permits no stop function                                                                      | Advise the customer that if the gearbox is too cold the stop function is not possible                                                             |
| Gear 1 or 2 not selected                     | The gear engaged by the automatic gearbox at standstill must be 1 or max 2!                                                | Repair gearbox.                                                                                                                                   |
| Clutch temperature load too high             | Excessively high clutch temperature permits no stop function.                                                              | Advise the customer that driving under high load will result in high clutch temperatures                                                          |
| Hydraulic fluid, pressure supply not assured | The gear oil auxiliary hydraulic pump has a malfunction.                                                                   | Check gear oil auxiliary hydraulic pump by means of final control diagnosis and repair possible faults.                                           |

### 03 - Brake Electronics

#### Start requests

| Reason                                        | Cause:                             | Handling                                                                                                                  |
|-----------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Hill descent control HDC / HDC button pressed | Activation of hill descent control | Explain to the customer that when hill descent control is active start-stop is not possible in certain driving situations |

|                                                      |                                                                                                                              |                                                                                                                                                                                    |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AUTO HOLD slip detection / slipping vehicle detected | Sliding vehicle detected.                                                                                                    | Explain to the customer that if the vehicle is sliding it should be immediately started up (as servo and braking force assistance is provided only with the engine running).       |
| Roll-back detected                                   | Rolling back vehicle detected                                                                                                | Explain to the customer that if the vehicle is rolling back it should be immediately started up (as servo and braking force assistance is provided only with the engine running)   |
| System malfunction                                   | A system error is entered if the control unit detects undervoltage or if the vacuum sensor of the brake servo unit is faulty | Advise the customer that if there is undervoltage the engine needs to be running                                                                                                   |
| Offroad mode active                                  | At low speeds it may be that not enough vacuum is generated                                                                  | Advise the customer that there must be brake vacuum when driving off-road even at low speeds in order to maintain braking response                                                 |
| Road surface incline too high                        | Road gradient too great                                                                                                      | Explain to the customer that in order to ensure comfortable start-stop driving (e.g. engine running for fast drive-off, brake assistance) the permissible road gradient is limited |
| ASR and ESP button operated                          | ESC-Off button pressed to activate ESC driving modes                                                                         | Explain to the customer that pressing the ESC OFF button selects a specific ESC driving mode (e.g. ESC Off, offroad), so start-stop is not possible for operational reasons        |

### Stop prohibitions

| Reason                                               | Cause:                                                                                                                                                                                              | Handling                                                                                                               |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Emergency braking / Hard deceleration to standstill  | If the ABS cuts in, in the event of heavy braking, or if the electronic parking brake (EPB) is operated down to a standstill, the ESP is intended to prevent the engine stopping for a certain time | Explain to the customer that the vehicle should be maintained ready to drive after emergency braking                   |
| AUTO HOLD slip detection / slipping vehicle detected | Sliding vehicle detected                                                                                                                                                                            | Explain to the customer that if the vehicle is sliding it should be immediately started up (as servo and braking force |

|                                                           |                                                                                                                               |                                                                                                                                                                                                           |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                           |                                                                                                                               | assistance is provided only with the engine running)                                                                                                                                                      |
| Roll-back detected                                        | Rolling back vehicle detected                                                                                                 | Explain to the customer that if the vehicle is rolling back it should be immediately started up (as servo and braking force assistance is provided only with the engine running)                          |
| System malfunction                                        | A system error is entered if the control unit detects undervoltage or if the vacuum sensor of the brake servo unit is faulty. | Advise the customer that if there is undervoltage the engine needs to be running                                                                                                                          |
| Hill descent control HDC / HDC button pressed             | Activation of hill descent control                                                                                            | Explain to the customer that when hill descent control is active start-stop is not possible for operational reasons                                                                                       |
| Brake control unit pump operation                         | Brake control unit pump running.                                                                                              | Explain to the customer that if the brake control unit pump is running, start-stop is not possible in order to safeguard key driving dynamics characteristics.                                            |
| Offroad mode active                                       | At low speeds it may be that not enough vacuum is generated                                                                   | Advise the customer that there must be brake vacuum when driving off-road even at low speeds in order to maintain braking response                                                                        |
| Deactivation of start/stop function in brake control unit | The start/stop function was deactivated by the adaption                                                                       | .                                                                                                                                                                                                         |
| Road surface incline too high                             | Road gradients too great                                                                                                      | Explain to the customer that in order to ensure comfortable start-stop driving (e.g. engine running for fast drive-off, brake assistance) the permissible road gradient is limited in discrete increments |
| ASR and ESP button operated                               | ESC-Off button pressed to activate ESC driving modes                                                                          | Explain to the customer that pressing the ESC OFF button selects a specific ESC driving mode (e.g. ESC Off, offroad), so start-stop is not possible for operational reasons                               |

## 08 - Air conditioner/heater electronics

### Start requests

| Reason                                                                          | Cause:                                                                                                     | Handling                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PSD (permissible stop duration) emergency running elapsed / PSD with active DTC | There is a fault in the AC. Therefore only a permissible stop duration of approx. 45 seconds is specified. | Work through the faults with the relevant test plans                                                                                                                                                                                                                                                                                                                        |
| Epsilon (output) blow-out temperature too low or too high                       | Air conditioner not yet at steady state                                                                    | Steady state is reached only after lengthy engine running. Check settings (adapt specified temperature to ambient temperature as necessary), check settings (adapt specified temperature to ambient temperature as necessary) to have more stop phases. If the adjustment is OK, explain to the customer that the A/C requires a certain time to respond to the temperature |
| Defrost active                                                                  | Customer has pressed the Defrost button.                                                                   | Advise the customer that the defrost function is causing the restart                                                                                                                                                                                                                                                                                                        |
| Ambient temperature too low or too high                                         | Ambient temperature outside nominal range                                                                  | Restart due to ambient temperature change so that climate control can be ensured.                                                                                                                                                                                                                                                                                           |
| Epsilon (output) interior temperature too low or too high                       | Customer temperature request too low/high                                                                  | Explain to the customer that a restart is performed if the selected interior temperature is not reached.                                                                                                                                                                                                                                                                    |
| Gradient dew point interior too high                                            | The rise in air humidity is too high                                                                       | Advise the customer that this will improve safety                                                                                                                                                                                                                                                                                                                           |
| Risk of misting                                                                 | Risk of windscreen misting                                                                                 | Advise the customer that this will improve safety                                                                                                                                                                                                                                                                                                                           |
| At least one specified temperature is High or Low                               | Customer AC setting High or Low                                                                            | Advise the customer that the restart is executed due to a Low/High AC setting.                                                                                                                                                                                                                                                                                              |
| Comfort humidity                                                                | Interior humidity ideally 50... 60%                                                                        | Advise the customer that this will improve safety                                                                                                                                                                                                                                                                                                                           |
| PSD (permissible stop duration) "Epsilon_Fog" elapsed *)                        | Risk of windscreen misting                                                                                 | Advise the customer that due to high levels of humidity in the evaporator it was necessary to restart in order to avoid window misting (mostly at very high ambient temperatures/high humidity levels)                                                                                                                                                                      |
| PSD (permissible stop duration) "Manual air                                     | Customer setting manual air recirculation                                                                  | Advise the customer that the "Manual air recirculation"                                                                                                                                                                                                                                                                                                                     |

|                                                                   |                                                                                                                                                                                                                                                      |                                                                                                                                                             |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| recirculation" elapsed *)                                         |                                                                                                                                                                                                                                                      | setting will reduce the stop duration in order to avoid window misting.                                                                                     |
| PSD (permissible stop duration) "Air distribution top" elapsed *) | Customer setting air vent up                                                                                                                                                                                                                         | Advise the customer that the "Air distribution top" setting can only enhance interior comfort to a limited extent, so the stop duration will be reduced.    |
| Evaporator temperature difference from setting                    | No data                                                                                                                                                                                                                                              | Necessary evaporator temperature for comfortable interior climate control was exceeded. Restart to set the optimal evaporator temperature was required.     |
| Stop release for A/C comfort adaption                             | Adaption channel to influence the permitted influence of start/stop on the interior comfort was changed.<br>Important note: This adaption channel can also be used to set a general stop prohibition and an immediate restart by the air conditioner | Advise the customer that his desire to shorten the stop duration was the reason for the restart                                                             |
| Interior comfort humidity too high                                | Interior humidity increased sharply                                                                                                                                                                                                                  | Advise the customer that the restart was carried out to restore optimal interior comfort.                                                                   |
| Interior vent difference to setting                               | Temperature of climate-controlled air from vents (chest vents and/or footwell vents) differs too much from AC control settings                                                                                                                       | Advise the customer that the temperature of the climate-controlled air is not yet sufficient for optimal interior climate control, so the stop is prevented |
| Interior temperature difference to setting                        | Interior temperature varies too widely from preset specified temperature.                                                                                                                                                                            | Advise the customer that the restart was carried out to restore optimal interior comfort.                                                                   |
| Maximum cooling and heating set                                   | At least one temperature preselector was set to "HI" or "LO".                                                                                                                                                                                        | Advise the customer that the restart is executed due to a Low/High AC setting.                                                                              |
| Head area heater                                                  | Customer has activated neck heating (convertible only)                                                                                                                                                                                               | Advise the customer that an immediate restart is executed due to the high current consumption of the neck heating.                                          |
| maximum stop duration reached                                     | Maximum stop duration has elapsed                                                                                                                                                                                                                    | Advise the customer that the maximum stop duration had been reached and a restart was necessary because setting of                                          |

|  |  |                                                          |
|--|--|----------------------------------------------------------|
|  |  | the optimal interior comfort could no longer be ensured. |
|--|--|----------------------------------------------------------|

### Stop prohibitions

| Reason                                                             | Cause:                                                        | Handling                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Epsilon (output) blow-out too low or too high                      | Air conditioner not yet stabilised - no steady state reached. | Steady state is reached only after lengthy engine running. Check settings (adjust specified temperature to outside temperature if necessary) in order to have more stop phases. If the adjustment is OK, explain to the customer that the A/C requires a certain time to respond to the temperature. |
| Defrost active                                                     | Customer has pressed the Defrost button                       | Advise the customer that the defrost function is preventing the stop                                                                                                                                                                                                                                 |
| Ambient temperature too low or too high                            | Ambient temperature outside nominal range                     | Ambient temperature too high/low. A stop would be uselessly short due to the very high heating/cooling demand.                                                                                                                                                                                       |
| Epsilon (output) interior temperature too low or too high          | Customer temperature request too low/high                     | Explain to the customer that a stop is prevented if the selected interior temperature is not reached.                                                                                                                                                                                                |
| Gradient dew point interior too high                               | The rise in air humidity is too high                          | Advise the customer that this will improve safety                                                                                                                                                                                                                                                    |
| Risk of misting                                                    | Risk of windscreen misting                                    | Advise the customer that in the event of a risk of windscreen misting the stop is prevented                                                                                                                                                                                                          |
| At least one specified temperature is High or Low                  | Customer AC setting High or Low                               | Advise the customer that the stop is prevented due to the Low/High AC setting                                                                                                                                                                                                                        |
| Comfort humidity                                                   | Interior humidity ideally 50...60%                            | Advise the customer that this will improve safety (windscreen misting)                                                                                                                                                                                                                               |
| PSD (permissible stop duration) "Epsilon_Fog" elapsed *)           | Risk of windscreen misting                                    | Advise the customer that this will improve safety (windscreen misting)                                                                                                                                                                                                                               |
| PSD (permissible stop duration) "Manual air recirculation" elapsed | Customer setting manual air recirculation                     | Advise the customer that the stop is prevented due to the "Manual air recirculation" setting                                                                                                                                                                                                         |
| PSD (permissible stop duration) "Air distribution top" elapsed     | Customer setting air vent up                                  | Advise the customer that the "Air distribution top" setting can only maintain interior                                                                                                                                                                                                               |

|                                                                                 |                                                                                                                                                                                                                                                      |                                                                                                                                                             |
|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                 |                                                                                                                                                                                                                                                      | comfort to a limited extent, so a stop prohibition is enforce.                                                                                              |
| PSD (permissible stop duration) emergency running elapsed / PSD with active DTC | A fault is entered in the climate control CU                                                                                                                                                                                                         | Read fault memory                                                                                                                                           |
| Evaporator temperature difference from setting                                  | No data                                                                                                                                                                                                                                              | Necessary evaporator temperature for comfortable interior climate control was exceeded. Restart request to avoid interior heat-up/window misting            |
| Interior vent difference to setting                                             | Temperature of climate-controlled air from vents (chest vents and/or footwell vents) differs too much from AC control settings                                                                                                                       | Advise the customer that the temperature of the climate-controlled air is not yet sufficient for optimal interior climate control, so the stop is prevented |
| Stop release for A/C comfort adaption                                           | Adaption channel to influence the permitted influence of start/stop on the interior comfort was changed.<br>Important note: This adaption channel can also be used to set a general stop prohibition and an immediate restart by the air conditioner | Advise the customer that the above adaption channel is set so that a stop is always prohibited                                                              |
| Interior comfort humidity too high                                              | .                                                                                                                                                                                                                                                    | Advise the customer that the stop was prevented due to high humidity (risk of window misting)                                                               |
| Interior temperature difference to setting                                      | Interior temperature varies too widely from preset specified temperature.                                                                                                                                                                            | Explain to the customer that a stop is prevented if the selected interior temperature is not reached.                                                       |
| Maximum cooling and heating set                                                 | At least one temperature preselector was set to "HI" or "LO".                                                                                                                                                                                        | Advise the customer that the stop is prevented due to Low/High AC setting                                                                                   |
| Head area heater                                                                | Customer has activated neck heating (convertible only)                                                                                                                                                                                               | Advise the customer that a stop is prevented due to the high current consumption of the neck heating.                                                       |
| Basic setting active                                                            | Diagnostic routine is active                                                                                                                                                                                                                         | Not relevant to customer                                                                                                                                    |

## 09 - Electronic central electrics

### Start requests

| Reason                                     | Cause:                                                                                                                                                           | Handling                                                                                                                                                    |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parking aid active                         | The parking aid button was pressed or reverse gear was engaged. During this time the start-stop function is deactivated.                                         | Advise the customer that this action deactivates the start-stop function.                                                                                   |
| Parking assistant active                   | The parking assistant button was pressed or reverse gear was engaged. During this time the start-stop function is deactivated.                                   | Advise the customer that this action deactivates the start-stop function.                                                                                   |
| Trailer manoeuvring system active          | If the trailer manoeuvring system is active (activation button indicates the active function), the start-stop function is deactivate and a start request is sent | Advise the customer that an active trailer manoeuvring system deactivates the start-stop function.                                                          |
| Defrost active                             | Customer has pressed the Defrost button.                                                                                                                         | Advise the customer that the defrost function is causing the restart                                                                                        |
| Ambient temperature                        | Ambient temperature outside nominal range                                                                                                                        | Restart due to ambient temperature change so that climate control can be ensured.                                                                           |
| Maximum cooling and heating set            | At least one temperature preselector was set to "HI" or "LO".                                                                                                    | Advise the customer that the restart is executed due to a Low/High AC setting.                                                                              |
| Interior temperature difference to setting | Interior temperature varies too widely from preset specified temperature.                                                                                        | Advise the customer that the restart was carried out to restore optimal interior comfort.                                                                   |
| Interior vent difference to setting        | Temperature of climate-controlled air from vents (chest vents and/or footwell vents) differs too much from AC control settings                                   | Advise the customer that the temperature of the climate-controlled air is not yet sufficient for optimal interior climate control, so the stop is prevented |
| Risk of misting                            | Risk of windscreen misting                                                                                                                                       | Advise the customer that this will improve safety                                                                                                           |
| Interior comfort humidity too high         | Interior humidity increased sharply                                                                                                                              | Advise the customer that the restart was carried out to restore optimal interior comfort.                                                                   |
| Stop release for A/C comfort adaption      | Adaption channel to influence the permitted influence of start/stop on the interior comfort was changed.                                                         | Advise the customer that his desire to shorten the stop duration was the reason for the restart                                                             |

|  |                                                                                                                                          |  |
|--|------------------------------------------------------------------------------------------------------------------------------------------|--|
|  | Important note: This adaption channel can also be used to set a general stop prohibition and an immediate restart by the air conditioner |  |
|--|------------------------------------------------------------------------------------------------------------------------------------------|--|

### Stop prohibitions

| Reason                                     | Cause:                                                                                                                         | Handling                                                                                                                                                    |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parking aid active                         | The parking aid button was pressed or reverse gear was engaged. During this time the start-stop function is deactivated.       | Advise the customer that this action deactivates the start-stop function.                                                                                   |
| Parking assistant active                   | The parking assistant button was pressed or reverse gear was engaged. During this time the start-stop function is deactivated. | Advise the customer that this action deactivates the start-stop function.                                                                                   |
| Defrost active                             | Customer has pressed the Defrost button                                                                                        | Advise the customer that the defrost function is preventing the stop                                                                                        |
| Ambient temperature                        | Ambient temperature outside nominal range                                                                                      | Ambient temperature too high/low. A stop would be uselessly short due to the very high heating/cooling demand.                                              |
| Maximum cooling and heating set            | At least one temperature preselector was set to "HI" or "LO".                                                                  | Advise the customer that the restart is executed due to a Low/High AC setting.                                                                              |
| Interior temperature difference to setting | Interior temperature varies too widely from preset specified temperature.                                                      | Explain to the customer that a stop is prevented if the selected interior temperature is not reached.                                                       |
| Interior vent difference to setting        | Temperature of climate-controlled air from vents (chest vents and/or footwell vents) differs too much from AC control settings | Advise the customer that the temperature of the climate-controlled air is not yet sufficient for optimal interior climate control, so the stop is prevented |
| Risk of misting                            | Risk of windscreen misting                                                                                                     | Advise the customer that in the event of a risk of windscreen misting the stop is prevented                                                                 |
| Interior comfort humidity too high         | .                                                                                                                              | Advise the customer that the stop was prevented due to high humidity (risk of window misting)                                                               |
| Stop release for A/C comfort adaption      | Adaption channel to influence the permitted influence of start/stop on the interior comfort was changed.                       | Advise the customer that the above adaption channel is set so that a stop is always prohibited                                                              |

|                                                             |                                                                                                                                                                                                                                                                                     |                                                                                                    |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|                                                             | Important note: This adaption channel can also be used to set a general stop prohibition and an immediate restart by the air conditioner                                                                                                                                            |                                                                                                    |
| maximum stop duration reached                               | There are various operating states in which the climate control does not identify a restart request via sensor values, but by way of the elapsed time. Risk of windscreen misting.                                                                                                  | Advise the customer that in the event of a risk of windscreen misting the stop is prevented        |
| Trailer manoeuvring system active by automatic reactivation | An active trailer manoeuvring system is deactivated by driving forward at above 10 km/h. On stopping and engaging reverse, the function is automatically reactivated if a vehicle speed of 20 km/h was not exceeded beforehand. In this case the start-stop function is deactivated | Advise the customer that an active trailer manoeuvring system deactivates the start-stop function. |
| Trailer manoeuvring system active                           | If the trailer manoeuvring system is active (activation button indicates the active function), the start-stop function is deactivate and a start request is sent                                                                                                                    | Advise the customer that an active trailer manoeuvring system deactivates the start-stop function. |

### 13 - Adaptive cruise control .

#### Start requests

| Reason                                                         | Cause:                                                                                                                                               | Handling                                                                                                           |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Driving ahead driving off, ACC off                             | The objects detected by the front radar in front of the vehicle set off from a standstill although the ACC system has been deactivated by the lever. | Advise the customer that monitoring of the objects in front of the vehicle is possible even with the ACC disabled. |
| Driving ahead Vehicles start moving, ACC passive               | The objects detected by the front radar in front of the vehicle set off from a standstill although the ACC system is not actively controlling.       | Advise the customer that monitoring of the objects in front of the vehicle is possible even with the ACC disabled. |
| Driving ahead driving off, ACC active, auto drive-off possible | The objects detected by the front radar in front of the vehicle set off from a standstill. The engine is started to enable automatic drive-off.      | Advise the customer that the ACC system may start the engine as soon as the traffic ahead sets off.                |

|                                                             |                                                                                                                                                                                 |                                                                                                     |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Driving ahead set off, ACC active, auto. drive-off disabled | The objects detected by the front radar in front of the vehicle set off from a standstill. The engine is started to drive off as soon as the driver inputs the command to do so | Advise the customer that the ACC system may start the engine as soon as the traffic ahead sets off. |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|

### Stop prohibitions

| Reason                                                         | Cause:                                                                                                                                                                          | Handling                                                                                                           |
|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Driving ahead driving off, ACC off                             | The objects detected by the front radar in front of the vehicle set off from a standstill although the ACC system has been deactivated by the lever.                            | Advise the customer that monitoring of the objects in front of the vehicle is possible even with the ACC disabled. |
| Driving ahead Vehicles start moving, ACC passive               | The objects detected by the front radar in front of the vehicle set off from a standstill although the ACC system is not actively controlling.                                  | Advise the customer that monitoring of the objects in front of the vehicle is possible even with the ACC disabled  |
| Driving ahead driving off, ACC active, auto drive-off disabled | The objects detected by the front radar in front of the vehicle set off from a standstill. The engine is started to drive off as soon as the driver inputs the command to do so | Advise the customer that the ACC system may start the engine as soon as the traffic ahead sets off                 |

## 19 - Data bus diagnostic interface

### Start requests

| Reason                           | Cause:                                                                                                                                                                       | Handling                                                                                 |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Consumer current too high        | Too many consumers were switched on. Customer has too many consumers operating simultaneously                                                                                | Advise the customer that too many activated consumers deactivate the start-stop function |
| Tappable battery charge too low  | The battery state of charge is not adequate to safeguard a protracted vehicle standing time (parking at the airport). Poor battery state of charge. Aged or cyclised battery | Run battery state of charge test program                                                 |
| Battery charge condition too low | The battery state of charge is not adequate to safeguard vehicle restarting (parking at the airport). Poor battery state of charge. Aged or cyclised battery                 | Run battery state of charge test program                                                 |

|                                        |                                                                                                                                                              |                                                                                                                                                           |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Charging contingent                    | During the stop phase, too much energy was consumed from the battery; this is primarily caused by extended stop phases                                       | Advise the customer that this action deactivates the start-stop function.                                                                                 |
| Low voltage                            | Inadequate battery voltage due to poor state of charge                                                                                                       | Run battery state of charge test program                                                                                                                  |
| Service life expired                   | The battery state of charge is not adequate to safeguard vehicle restarting (parking at the airport). Poor battery state of charge. Aged or cyclised battery | Run battery state of charge test program                                                                                                                  |
| Restart because of outside temperature | Ambient temperature very low                                                                                                                                 | Advise the customer that there is a risk that the required starter current to start the engine might not be available due to the low ambient temperature. |
| Special start requirements             | previously not implemented (rate action)                                                                                                                     | .                                                                                                                                                         |

### Stop prohibitions

| Reason                           | Cause:                                                                                                                                                                                                                   | Handling                                                                                                                                                                        |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Battery temperature              | The battery temperature was too high or too low                                                                                                                                                                          | Advise the customer that this is a battery protection function. The battery should not be already damaged by exceeding or undershooting the temperature limits                  |
| Special veto active              | Transport mode was active; production mode was active; quick no-load current measurement was active                                                                                                                      | Reset transport/production mode as necessary                                                                                                                                    |
| Idle speed increase active       | Too many consumers were active; battery discharged during driving. Alternator function not safeguarded. Charging cable has excessively high contact resistance. Customer has too many consumers operating simultaneously | Check wiring from alternator to battery and check alternator function. If necessary, explain to the customer that too many active consumers deactivate the start-stop function. |
| Possible standing time too short | The battery state of charge is not adequate to safeguard a minimum stop time. Poor battery state of charge. Aged or cyclised battery                                                                                     | Run battery state of charge test program                                                                                                                                        |

|                                  |                                                                                                                                                                                    |                                                                                                                                                           |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Consumer current too high        | Too many consumers were switched on. Customer has too many consumers operating simultaneously.                                                                                     | Explain to the customer that too many active consumers deactivate the start-stop function.                                                                |
| Tappable charge too low          | The battery state of charge is not adequate to safeguard a protracted vehicle standing time (parking at the airport).<br>Poor battery state of charge.<br>Aged or cyclised battery | Run battery state of charge test program                                                                                                                  |
| Charge too low                   | Battery charge time since last engine stop too short                                                                                                                               | Explain to the customer that this will ensure reliable restarting.                                                                                        |
| Battery charge condition too low | The battery state of charge is not adequate to safeguard a protracted vehicle standing time (parking at the airport).<br>Poor battery state of charge.<br>Aged or cyclised battery | Run battery state of charge test program                                                                                                                  |
| intermittent operation           | During the last start-stop stop phase, a specific charge was tapped from the 12V battery. For that reason, a restart was requested.                                                | Charge is reconnected after restarting by running the combustion engine                                                                                   |
| Outside temperature              | Ambient temperature very low                                                                                                                                                       | Advise the customer that there is a risk that the required starter current to start the engine might not be available due to the low ambient temperature. |
| Usable battery charge too low    | 12V battery tappable charge too low                                                                                                                                                | Battery recharging                                                                                                                                        |
| Energy management special veto   | Transport mode set                                                                                                                                                                 | Deactivate transport mode                                                                                                                                 |

## 22 - Four-wheel drive electronics

### Stop prohibitions

| Reason             | Cause:                                                                                          | Handling                                                                  |
|--------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Active system test | The system is performing a self-test. During this time the start-stop function is not possible. | Advise the customer that this action deactivates the start-stop function. |

## 44 - Power steering

### Stop prohibitions

| Reason                              | Cause:                                             | Handling                                                                                                                                                                                                                                                       |
|-------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Manual steering torque too large    | Steering wheel was moved at standstill             | Advise the customer that this action forces the engine to start, as it is interpreted as manoeuvring for which steering assistance is desired                                                                                                                  |
| Calculated steering angle too large | The steering angle is more than 300°               | Advise the customer that this action forces the engine to run. At a steering angle greater than 300°, steering assistance is required immediately on driving off due to the steering correction forces.                                                        |
| Limp home mode active               | Internal fault in control unit (e.g. sensor error) | Advise the customer that due to an internal defect the steering assistance of the steering gear is reduced to 30% and the yellow warning lamp is displayed. After an ignition on/off cycle, the steering is continuously switched off with a red warning lamp. |

### Start requests

| Reason                           | Cause:                                 | Handling                                                                                                                                      |
|----------------------------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Manual steering torque too large | Steering wheel was moved at standstill | Advise the customer that this action forces the engine to start, as it is interpreted as manoeuvring for which steering assistance is desired |

## 46 - Convenience system central control unit

### Stop prohibitions

| Reason             | Cause:                                             | Handling                                                                                                                                                   |
|--------------------|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Key not in vehicle | Communication between key and vehicle interrupted. | Check batteries in key or move key into vehicle. If this is OK, advise the customer where appropriate that this action deactivates the start/stop function |
|                    | Battery in key too weak.                           |                                                                                                                                                            |
|                    | Key removed while vehicle running                  |                                                                                                                                                            |

## 74 - Chassis control

### Stop prohibitions

| Reason | Cause: | Handling |
|--------|--------|----------|
| .      | .      | .        |
| .      | .      | .        |
| .      | .      | .        |

### Start requests

| Reason | Cause: | Handling |
|--------|--------|----------|
| .      | .      | .        |
| .      | .      | .        |
| .      | .      | .        |

## A5 - Driver assistance systems

### Stop prohibitions

| Reason                        | Cause:                                                                                                                                                           | Handling                                                                                           |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Park assist active            | The parking assistant button was pressed or reverse gear was engaged. During this time the start-stop function is deactivated.                                   | Advise the customer that this action deactivates the start-stop function.                          |
| Trailer positioning assistant | If the trailer manoeuvring system is active (activation button indicates the active function), the start-stop function is deactivate and a start request is sent | Advise the customer that an active trailer manoeuvring system deactivates the start-stop function. |

### Start requests

| Reason                        | Cause:                                                                                                                                                           | Handling                                                                                           |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Park assist active            | The parking assistant button was pressed or reverse gear was engaged. During this time the start-stop function is deactivated.                                   | Advise the customer that this action deactivates the start-stop function.                          |
| Trailer positioning assistant | If the trailer manoeuvring system is active (activation button indicates the active function), the start-stop function is deactivate and a start request is sent | Advise the customer that an active trailer manoeuvring system deactivates the start-stop function. |

## C5 - Thermal management

### Stop prohibitions

| Reason                                  | Cause:                                                                    | Handling                                                                                                                                                                                                                                                                           |
|-----------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power quota, thermal management         | Possibly HV battery state of charge too low                               | Advise the customer that in stop mode the interior climate control is in part implemented via the HV components and so at higher or lower ambient temperatures the required resources increase and a relatively empty HV battery can no longer provide sufficient energy reserves. |
| Stop prohibition from AC operating unit | Specified interior temperature not yet reached or defrost function active | Advise the customer that the defrost function, or a still too cold or warm interior, will prevent stopping                                                                                                                                                                         |
| Outside air temperature too low         | Ambient temperature <-15°C                                                | Advise the customer that at ambient temperatures < -15°C stopping is prevented                                                                                                                                                                                                     |
| Heater output                           | Inadequate heat output due to coolant temperature still being too low     | Advise the customer that the combustion system cannot yet provide enough heat for climate control of the vehicle interior.                                                                                                                                                         |

### Start requests

| Reason                                  | Cause:                                     | Handling                                                                                                                                                                                                                                                                           |
|-----------------------------------------|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power quota, thermal management         | HV power below critical level              | Advise the customer that in stop mode the interior climate control is in part implemented via the HV components and so at higher or lower ambient temperatures the required resources increase and a relatively empty HV battery can no longer provide sufficient energy reserves. |
| Stop prohibition from AC operating unit | Bundled reasons from KBT. Advise potential | customers that the defrost function, or a no longer conditioned vehicle interior, will result in a restart                                                                                                                                                                         |
| Outside air temperature too low         | Ambient temperature <-15°C                 | Advise customers that at ambient temperatures < -15°C stopping is prevented or a restart is requested as appropriate.                                                                                                                                                              |

|               |                                                                                                                         |                                                                                                                                                                                                  |
|---------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Heater output | Electrical heat output by HV components and thermal heat output by coolant no longer adequate to condition the interior | Advise the customer that neither the coolant in the combustion system nor the HV components were able to supply the heat output necessary to maintain the required vehicle interior temperature. |
|---------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|