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Electronic Vehicle Immobilization System EWS 2

History of BMW vehicle immobilization systems

On vehicles produced up to late 1994 vehicle immobilization can be activated via the antitheft alarm system (DWA) or the on-board computer (BC) fitted on the assembly line.

On vehicles built in the production period from May 1993 to January 1994 this vehicle immobilization can be additionally activated via the central locking system (ZV).

After deactivation via the key and the lock barrel proved to be more and more a weak point in the antitheft system, the newly developed electronic vehicle immobilization (EWS 1) has been fitted as standard since January 1994 in all BMW vehicles (exception: E30, E32, E36 without ZV). This is documented by SA900. This vehicle immobilization system fulfilled the requirements of fully comprehensive insurance providers at that time

The development of vehicle immobilization systems made further progress resulting in all BMW vehicles worldwide being fitted as standard with an electronically coded vehicle immobilization system (EWS 2) as from January 1995. The EWS 2 prevents the vehicle from being driven under its own engine power as the result of tampering with the ignition lock or doors.

The electronic vehicle immobilization system, stage 2 (EWS 2) fulfilled the more stringent requirements of the European fully comprehensive insurance providers that came into force in January 1995.

Insurance requirements

- The vehicle must be equipped with an electronic vehicle immobilization system that operates independent of the mechanical lock system and which prevents vehicle operation by means of coded intervention in the engine management.
- This immobilization system must be self-arming and must be effective on leaving the vehicle or on locking it at the latest.
- Deactivation must not take place with the mechanical key but rather it must be implemented by electronic means.

Explanation of important terms

Term	Explanation
Transponder	Hybrid term derived from the words <i>transmitter</i> and <i>responder</i> . The transponder is a special transceiver.
Transponder chip	Electronic module in the key which basically consists of the transceiver, a small antenna coil and a memory.
ISN	<i>I</i> ndividuelle <i>S</i> teuergerätenummer (= individual control unit number), i.e. a number (production number) allocated individually by the control unit manufacturer to each engine control unit (DME/DDE).

System overview

The EWS 2 system consists of the following components:

- Key with transponder
- Loop antenna (coil) at steering lock
- Transceiver electronics (S/E module)
- EWS control unit
- Engine control unit (DME/DDE) with coded start enable input

Key with transponder

The transponder is a special transceiver in the key which can communicate with the EWS control unit via the transceiver electronics (S/E module). The transponder chip integrated in the key consists of the transceiver, a small antenna coil and a read/write memory.

The transponder chip is powered by the transceiver module via the loop antenna at the steering lock. This means that no battery is necessary in the key for power supply. The power supply and data transfer take place in the same way as a transformer between the loop antenna (coil) at the ignition lock and the antenna coil integrated in the key. The maximum range for writing and reading is 2 cm.

The transponder memory contains:

- Key data
- Service data

Important

Each individual key (with or without remote control) contains a transponder chip with its own key data thus making it unique!

Loop antenna (coil) at steering lock

The coil consists of 75 windings and fitted on the lock barrel of the ignition lock.

Transceiver electronics (S/E module)

The electronic transceiver module (S/E module) serves the purpose of data processing and controlling data transfer to the transponder and also communicates with the EWS control unit. This communication takes place on a serial bi-directional single-wire line.

The transceiver module is installed in the vicinity of the steering column. It receives power as from ignition lock position 1.

EWS control unit

The EWS control unit is the interface to the electronic transceiver module (S/E module), engine control unit and starter.

The main tasks of the EWS control unit are:

- Acquiring the key data from the transponder.
- Coded enabling of the engine management with a valid key.
- Storing the individual control unit number (ISN) of the respective engine control unit for coded data exchange.
- Managing the key data for a total of 10 keys.

Power is supplied via terminal 30.

Engine control unit (DME/DDE) with coded start enable input

The engine control unit (DME/DDE) was designed such that the ignition (terminal 15) and the fuel supply are enabled only when a correct enable signal is received from the EWS control unit.

The basis of this enable signal is the individual control unit number (ISN) of the engine control unit.

The engine control unit (DME/DDE) must identify this enable signal before it then enables

the ignition signal (terminal 15) and the fuel supply.

For this reason, after replacing the engine control unit (DME/DDE), the individual control unit number (ISN) of the new engine control unit must be transferred by means of coding (DIS tester or MoDiC) into the EWS control unit. The individual serial number is not available from the outside.

Key identification and start procedure

- Ignition lock in position 2 The transponder is powered via the loop antenna and sends the key data to the EWS control unit.
- The EWS control unit then checks the key data to ensure it is correct and only then sends an enable signal to the engine management system and starter.

On automatic transmission vehicles, the position of the gear selector lever is additionally determined and the starter is enabled only in position P or N.

- After the engine has started, the EWS control unit generates new key data and transfers them to the transponder.
- The starter is switched off when the EWS control unit detects a certain engine speed for a certain period of time. This engine speed variant depends on the type of engine.

CAUTION!

For safety reasons, the EWS control unit features a code-dependent afterrunning time (typically 10 s). The afterrunning time begins as soon as the ignition lock is in position 0 *and* no diagnosis telegrams are sent to the EWS control unit.

Observe the following points when checking keys:

The EWS control unit does *not* acquire any key data from the key during the afterrunning period. For this reason the engine can be started with any mechanically fitting key (also with an electronic defect) during the afterrunning time when changing a key!

To check keys, proceed as described in the following:

- If the service tester DIS or MoDiC is connected: Unplug diagnostic connector from vehicle.
- Switch ignition lock to position 0 and remove the key used for this purpose.
- Wait for afterrunning time to elapse, ignition lock must remain in position 0!
- Insert the key to be checked, turn ignition lock to position 2.
- Attempt to start the engine.

The duration of the afterrunning time can be read out with the diagnostic program of the EWS control unit as the "self-arming time" under "service functions", "read coding data".

Note

For safety reasons, during a start enable, the central locking is opened from a secured status.

Typical procedure

It is necessary to initialize and synchronize the control units and transponder during vehicle production or after replacing individual EWS components. The typical procedure at the production plant as well as at the dealer is described in the following:

First-time initialization at the production plant

The EWS control unit and the 4 vehicle keys are initialized with the key data created in a programming station. The key data for a further 6 replacement keys that have not yet been cut are additionally written in the EWS control unit. All key data (of a total of 10 keys) are stored in a database. The individual control unit number (ISN) is then read out of the engine control unit and entered in the EWS control unit. Initialization is now concluded and the vehicle is ready for operation.

Procuring replacement keys

Replacement keys can be obtained from a sales point only via a BMW dealer where one of the 6 replacement keys fitting the vehicle is programmed. This key is *not* a copy of the lost key, but rather a *new* key.

Important

The sales centre *always* makes a *new* key! A total of not more than 6 replacement keys suitable for the installed EWS control unit can be made and handed over! The key data of delivered replacement keys are deleted from the database!

The order for making a key in the sales centre cannot be further processed before all the necessary customer and dealer data have been submitted in full.

CAUTION!

Every request for a key is documented so that all inquiries from insurance companies and authorities can be followed up.

In view of the more stringent antitheft requirements, the procurement of replacement keys will in future be more involved than it has been in the past.

As from key No. 5 (first replacement key) all replacement keys will feature an 'E' on the

key bit for identification purposes.

Disabling keys

With the aid of the DIS tester, a lost key can be disabled on the vehicle and re-enabled if the key is found again. *All* keys still in the customer's possession must be submitted for this purpose.

Replacement of the EWS control unit

A pre-initialized control unit must be obtained from the designated sales centre for the purpose of replacing the EWS control unit. The procedure is similar to that for procuring replacement keys.

The new EWS control unit must then be encoded in the vehicle. During this procedure the individual control unit number (ISN) of the engine control unit (DME/DDE) is transferred to the EWS control unit. The encoding procedure must be carried out as follows:

- Select the defective EWS control unit that is still installed in the vehicle with the coding program. The data are then buffered in the MoDiC or DIS tester.
- Install new EWS control unit.
- Encode new EWS control unit, i.e. transfer the buffered data.
- If diagnosis is no longer possible on the defective EWS control unit, it will be necessary to enter the vehicle identification number and the central encoding code by hand in the new EWS control unit.

Replacement of engine control unit (DME/DDE)

After replacement, the new engine control unit must be encoded by means of the DIS tester or MoDiC. During this procedure the individual control unit number (ISN) stored in the engine control unit (DME/DDE) is transferred to the EWS control unit.

Replacement of the transceiver module (S/E module)

Initialization is not necessary.

Obtaining spare parts

In addition to the production plants, the following sales centres are currently equipped with programming stations for the purpose of initializing EWS components:

- For Europe: Dingolfing (Central Parts Distribution Depot)
- 2 centres in the USA for North, Central, South America and Canada
- For East Asia, Australia and Oceania: Japan
- For Southern Africa: South Africa

The following EWS 2 components are available as spare parts through the sales centres:

- Pre-initialized transponder key
- Pre-initialized EWS 2 control unit
- Pre-encoded/non-coded DME/DDE
- Steering lock barrel
- Lock barrel for doors and lids/flaps
- Lock barrel with key without transponder
- Pre-initialized uniform lock system with EWS 2 control unit
- Electronic transceiver module (S/E module)
- Loop antenna (coil)

Procedure for loss of all 10 keys

By providing all the necessary data, the authorized customer is able to obtain from the sales centre a new EWS control unit and new initialized transponder keys with the previous mechanical key code via a BMW dealer.

If all 10 keys *and* all acquired data (also in the database centre) are lost it will be necessary to replace both the EWS control unit as well as all the keys. Since, in this case, the parts are not standard stock, the parts are supplied only by the Central Parts Distribution Depot (ZKA).

Diagnosis

The diagnosis capabilities of the EWS system are supported by the use of the 'electronic vehicle immobilization EWS' diagnostic program (available on DIS tester).

Troubleshooting is greatly facilitated by the selection of fault symptoms and working through corresponding test modules.

In addition, functions are provided for the purpose of determining the validity of existing keys ('key test') and checking correct data matching between the DME/DDE and EWS control unit ('EWS DME/DDE data comparison').

Proceed as follows in the case of complaint:

- Connect DIS tester to diagnosis socket in the vehicle.
- Switch ignition lock to position 2.
- Select model series

Model series E31/34/36:

- On page 'Diagnosis CONTROL UNITS' select the EWS control unit under '16 ELECTRONIC VEHICLE IMMOBILIZATION EWS'.
- Schematic circuit diagrams are available in paper document form.

Model series E38:

- Identify vehicle. The page 'Diagnosis vehicle identification' follows
- Press 'function selection' button. Select 'EWS system' in the 'Diagnosis function and component selection' page for the drive or body.
- Continue in the diagnosis program by pressing the 'testing schedule' button.
- The corresponding functional description, schematic circuit diagrams, pin assignments and installation locations of the EWS components are provided under 'Documents'.

Encoding

Encoding is of decisive importance in the EWS system. After replacing the EWS control unit or the engine control unit (DME/DDE) the EWS control unit must always be correctly adapted by means of encoding otherwise it will not be possible to start the engine.

Procedure:

- Connect DIS tester or MoDiC.
- Switch ignition lock to position 2.

If replacing EWS control unit:

- Select 'Replacement coding'.
- Select the EWS control unit under 'control unit selection'.

The encoding procedure begins with reading out the data from the old, defective EWS control unit still fitted in the vehicle.

The data entered in the defective EWS control unit are buffered in the DIS tester or MoDiC. After replacement the buffered data are entered in the newly installed EWS control unit.

Important

This procedure (read data from defective component - install new part - transfer data to new part) must always be carried out in this order when replacing an EWS control unit!

If the EWS control unit to be replaced no longer has communication capabilities it will be necessary to enter the vehicle identification number and the central encoding code (ZCS) by hand. All other service data can no longer be read out of the old EWS control unit and are therefore lost.

If replacing engine control unit (DME/DDE):

The encoding procedure is carried out after replacing the engine control unit.

- Select programming
- Select the engine control unit under 'control unit selection'.

Matching with the EWS control unit takes place automatically during the programming procedure.

Electronic vehicle immobilization system EWS3

The EWS3 serves as an antitheft system and enables start of BMW vehicles.

The function of the EWS3 is basically the same as that of the EWS2:

A transponder chip is integrated in each of the vehicle keys. A ring coil is fitted about the ignition lock. The transponder chip is powered by the EWS3 control unit via this coil, i.e. no battery is required in the key. The power supply and data transfer take place in the same way as a transformer between the ring antenna (coil) at the ignition lock and the transponder chip integrated in the key. In contrast to EWS2, this takes place directly and without any additional intermediate components.

The key then sends data to the EWS3 control unit. If these data are correct, the EWS3 enables the starter by way of a relay installed in the control unit and additionally sends a coded start enable signal via a data link to the DME/DDE.

In addition, the EWS3 replaces the contact in the ignition lock for the "ignition key in lock" signal on US versions.

Components

Key with integrated transponder chip

A chip which can both transmit as well as receive (transponder) is integrated in the key. This transponder chip obtains its power from the field built up by the ring coil and uses it to communicate with the EWS3 control unit. This means that no battery is necessary in the key for power supply. Every key or the transponder integrated in it is a unique part. The control unit can also differentiate between the individual keys. The key transmits and

receives data from/to the EWS control unit.

If errors occur during communication between the EWS3 control unit and the individual keys, these errors are stored in the fault code memory - separate for each individual key -.

Ring coil

The ring coil is fitted on the ignition lock and serves as an antenna for communication between the transponder chip (in the key) and control unit.

EWS3 control unit

The EWS3 control unit communicates with the key fitted in the ignition lock. If the communication procedure is correct and the key has sent all data necessary for identification and start enable to the control unit, the control unit detects whether the key is valid and has been released for use. If this is the case, it releases the starter relay located in the control unit and sends a coded enable signal via the data link to the DME/DDE.

The control unit can manage a maximum of 10 keys allocated to the control unit, i.e. a maximum of 6 replacement keys are possible.

The control unit can identify the individual keys thus making it possible to disable/enable individual keys and to store fault codes for each individual key separately in the fault code memory.

Data link to DME/DDE

The EWS3 control unit sends a coded enable signal to the DME/DDE via the data link. The engine cannot be started before this signal has been transferred.

Engine control unit (DME/DDE) with coded start enable input

The engine control unit (DME/DDE) only enables ignition and fuel supply if a correct enable signal is received from the EWS control unit.

EWS-DME/DDE interface

The diagnostic program indicates under <Service functions> <Coding data> whether the interface is an EWS 3.2 or EWS 3.3 interface.

EWS 3.2

In the same way as in the EWS 2, the basis of the enable signal sent by the EWS 3.2 to the DME/DDE is a variable code made up of the individual control module numbers (ISN) of the engine control unit.

For this reason, after replacing the engine control unit (DME/DDE), the individual control unit number (ISN) of the new engine control unit must be transferred by means of coding into the EWS control unit (ISN calibration). The ISN cannot be changed from the outside.

EWS 3.3

In the EWS 3.3, the enable signal is based on a variable code resident in the EWS control unit. It is therefore necessary to adapt a new DME/DDE control unit to the EWS 3.3 control unit.

Important!

Test replacement of the DME/DDE control units is *no longer possible* in the case of engine control units with EWS 3.3 interface as adaptation to the EWS control unit is only possible with a new (virgin) DME/DDE control unit.

Influencing variables

P/N input for automatic transmission

Whether the vehicle is equipped with automatic transmission is defined in the coding.

On automatic vehicles, a start procedure is enabled by the EWS3 only if the selector lever is in position P or N.

The EWS3 control unit receives the information with regard to the selector lever position twice:

- Via a data link
- Via the K-bus

If the information "selector lever in position P or N" is sent only via the K-bus but, due to a fault, not via the data link, noticeable start delays within the range of 1 - 2 s can occur.

"ZV armed" signal/BC code active

The EWS3 control unit receives these two items of information only via the K-bus.

This information can be read out via "diagnosis scan" in the diagnosis program.

If the EWS3 receives the "ZV armed" signal from the general module, in ignition lock position 1 (terminal R), the EWS3 sends a signal via the K-bus which releases (enables) the vehicle.

Start is not enabled as long as the EWS3 receives the "BC code active" signal.

Afterrunning time

Important!

For safety reasons, the EWS3 control unit features a code-dependent afterrunning time. It begins when the ignition lock is switched to 0 position. Within this afterrunning time start with any mechanically fitting key is enabled.

Key identification and start procedure

- The transponder in the key is powered via the loop antenna and sends the key data to the EWS3 control unit.
- The EWS3 control unit then checks the key data to ensure it is correct and only then sends an enable signal to the engine management system and starter.
- After the engine has started, the EWS3 control unit generates new key data (change code) and transfers them to the transponder in the key.

Changing individual components

Key

In the same way as with EWS2, replacement keys can be obtained from a sales point only via a BMW dealer where one of the 6 replacement keys fitting the vehicle is programmed. This key is not a copy of the lost key, but rather a new key.

A total of not more than 6 replacement keys suitable for the installed EWS control unit can be made and handed over.

There is a noticeable start delay of 1 - 2 s when a new key is inserted in the ignition lock for the very first time. From then on, the start procedure should take place without delay.

Lost keys must be blocked by means of diagnosis. Refer to "Special features of the diagnosis program".

CAUTION!

Every request for a key is documented so that enquiries from insurance companies and authorities can be followed up.

Procedure for loss of all 10 keys

A new EWS3 control unit is required if all 10 keys are lost.

By providing all the necessary data, it is possible to obtain a new EWS3 control unit from a BMW dealer and the new transponder keys allocated to it with the previous mechanical key code.

EWS3 control unit

The basic procedure is the same as with EWS 2 systems:

The following procedure should be adhered to when replacing the EWS 3.3 control unit:

- Before replacing the EWS 3 control unit: Leave defective control unit installed in vehicle and in the coding program (Encoding ZCS) select point "1 New coding - 1 Replace control unit - 1 Read out data from defective control unit". Coding data and vehicle-specific data are read out of the EWS control unit with this part of the program and buffered in the MoDiC or DIS tester.
- Now install new EWS 3 control unit.
- After replacing the control unit: Encode new EWS 3 control unit with coding program selection point "1 New coding - 1 Replace control unit - 2 Transfer data to new control unit and encode control unit". The buffered data are now transferred and EWS - DME/DDE matching is carried out.

Note

The procedure described above must be adhered to as all the data necessary for vehicle identification are also stored in the EWS control unit. It will be necessary to do without the data readout from the old control unit only if the EWS 3 control unit no longer has diagnostic capabilities.

Proceed as follows in this case:

- Install new EWS control unit in the vehicle and encode with the encoding program and selection point "1 New coding - 2 Re-encode control unit".
- Then carry out matching with selection point "EWS - DME/DDE matching".
- In this procedure, the vehicle data necessary for automatic vehicle identification cannot be written to the EWS control unit.

Replacement of engine control unit (DME/DDE)

After replacing the engine control unit, "EWS - DME/DDE matching" must be conducted with the coding program or in the diagnosis program.

Important! The ignition must then be switched off for at least 25 s.

Special features of the diagnosis program.

The following points are contained under point "3 service functions":

Data comparison EWS-DME/DDE (only on EWS 3.2)

Here, the individual control unit number (ISN) stored in the engine control unit (DME/DDE) is compared with the number stored in the EWS control unit.

Start enable to the DME/DDE is only possible if both individual control unit numbers are identical.

If both ISN numbers are not identical, EWS-DME/DDE calibration must be carried out manually.

Key test

The following information concerning the key currently inserted in the ignition lock is displayed: Key No., disabled/enabled, valid/invalid, fault code memory entries concerning the current key

Disable/enable key

It is possible to disable or enable individual keys electronically via the diagnosis function.

Important!

Electronically disabled means that both the starter as well as the engine control unit are not released (enabled) for the start procedure. It should be borne in mind that an electronically disabled key still fits mechanically, i.e. all flaps, lids and doors can still be opened.

Display of keys used to date in this vehicle

Here, the display shows for each one of the 10 keys which can be managed by the EWS3 control unit whether it has been recognized at least once by the EWS3 control unit, i.e. it is possible to trace, also on older vehicles, how many keys have already been used in this particular vehicle.

Electronic Vehicle Immobilisation System EWS 3.3

The EWS 3.3 serves as an antitheft alarm system and enables the start of BMW vehicles. A transponder chip is integrated in each of the vehicle keys. A ring coil is fitted about the ignition lock. The transponder chip is powered by the EWS3 control unit via this coil, i.e. no battery is required in the key. The power supply and data transfer take place in the same way as a transformer between the loop antenna (coil) at the ignition lock and the transponder chip.

The key then sends data to the EWS3 control unit. If these data are correct, the EWS 3 control unit enables the starter by means of a relay located in the control unit and additionally sends a coded start enable signal via a data link to the DME/DDE. These procedures may result in a start delay of up to half a second.

Components

Data link to DME/DDE

The EWS3 control unit sends a coded enable signal to the DME/DDE via the data link. The engine cannot be started before this signal has been transferred.

Engine control unit (DME/DDE) with coded start enable input

The engine control unit (DME/DDE) only enables engine start if a correct enable signal is received from the EWS control unit.

EWS-DME/DDE interface

Identical variable codes are stored in the EWS 3.3 control unit and in the DME/DDE control unit. The value of these codes changes after every start procedure. Start enable only takes place if the code sent by the EWS control unit agrees with the code calculated in the DME/DDE control unit.

The control units are allocated only during initial programming of the DME/DDE control unit. The engine control unit then adopts the basic code of the EWS control unit.

Important

It is *not possible* to replace the DME/DDE or EW 3.3 control units for *test purposes*!

In rare cases, it is possible that the variable codes in both control units deviate from each other. In these cases, it is possible to reset both codes to the initial value via the service function DME(DDE) EWS III matching.

Key identification and start procedure

The following procedure takes place after inserting the vehicle key in the ignition lock:

- The transponder in the key is powered via the loop antenna and sends the key data to the EWS3 control unit.
- The EWS3 control unit checks the key data to ensure it is correct and only then sends an enable signal to the starter.
- The EWS3 control unit sends the variable code to DME/DDE. There, the variable code is checked against the saved variable code; if they match, the fuel injection is released.
- After the engine has started, the EWS3 control unit generates new key data (change code) and transfers them to the transponder in the key.
- A new variable code is also created and stored in the DME/DDE control unit.

Fault recognition in engine control unit

The following faults are monitored in the engine control unit:

- Interface, i.e. line to EWS control unit: In this case, the check is carried out in order to establish whether a signal is received and whether this signal is not subject to excessive interference.
- Variable code: A check is conducted as to whether the variable code which is sent by the EWS control unit agrees with the value calculated in the DME(DDE) control unit.

Engine start is inhibited if a fault is detected.

Comparison Images EWS Oscilloscope Measurement

Checking data lead from the EWS to the DME/DDE control unit

Oscilloscope measurement with metrology in the DIS

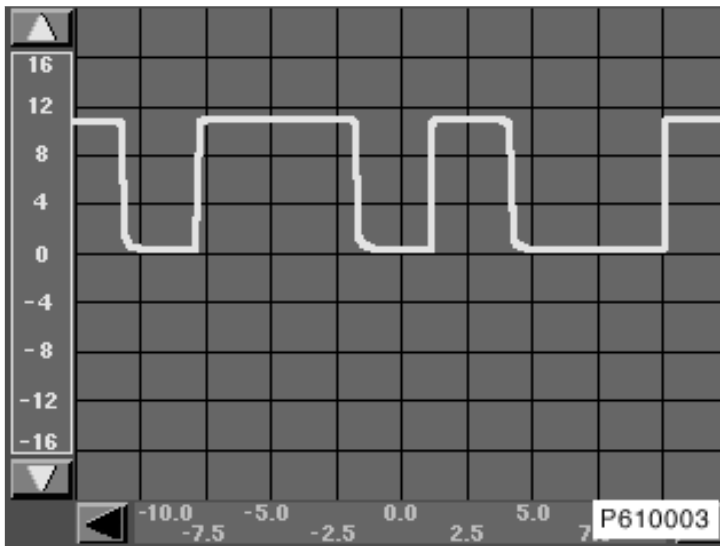
When doing this, proceed as follows:

- Install test adapter between DME/DDE and vehicle wiring harness.
Proceed in accordance with the wiring diagram.
On the M73, EWS2 or EWS 3.2: DME1 on the M73, EWS 3.3: First test for DME1, then for DME2
- Carry out oscilloscope measurement between terminal 31 (control unit) and EWS data lead
- Measuring cable: MFK1
- Measuring channel: Channel A
- Measuring range: +/-20V
- Voltage form: =
- Frequency range: 40 Hz
- *Terminal 15 ON*

Important

During the measurement, the DME/DDE must be connected.

The following illustration shows the oscilloscope image of a measurement on a data lead through which the EWS signal is correctly transmitted.



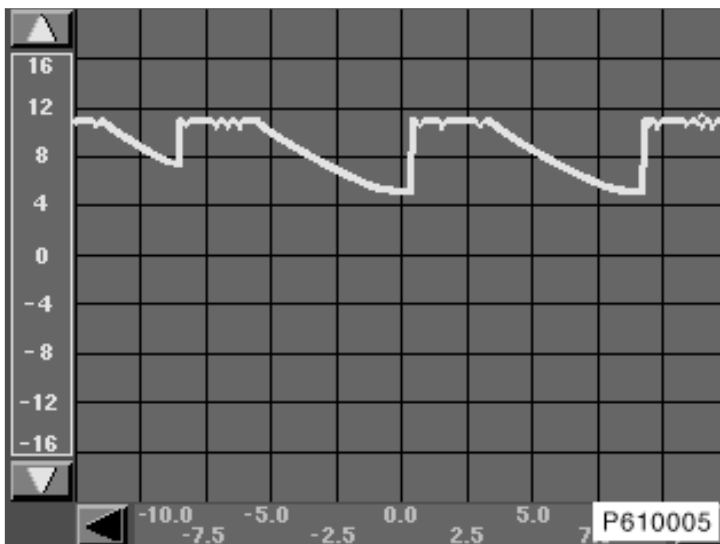
Signal OK

Note that the statement "OK" only refers to the data lead and the signal form. It is unable to determine whether the transmitted code is correct.

If it is still not possible to start the engine:

EWS 2, EWS 3.2: Conduct a data comparison EWS-DME/DDE

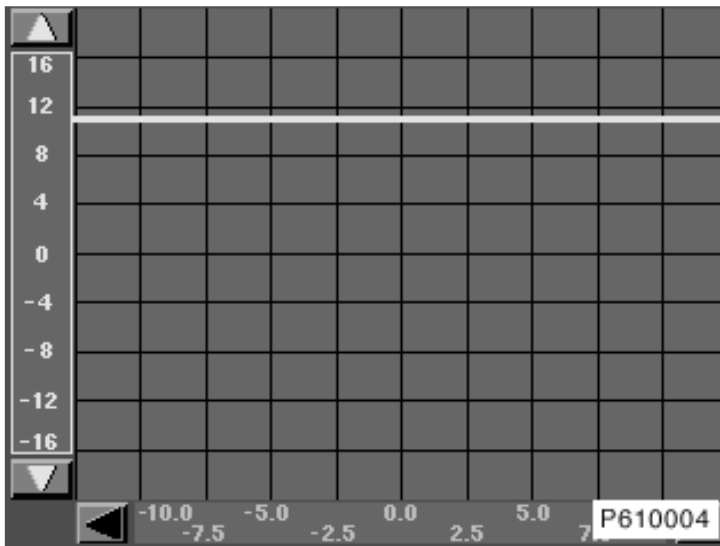
EWS 3.3: Conduct a EWS-DME/DDE match



Signal not OK

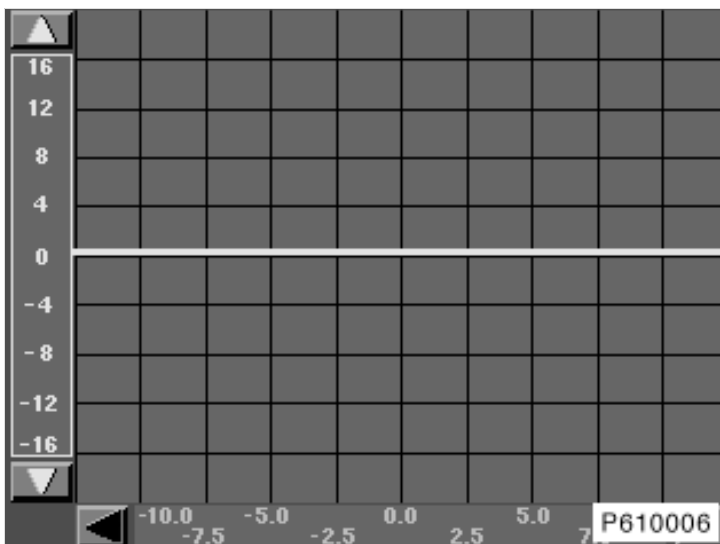
The above signal indicates a fault in the DME/DDE.

Continue fault finding in the DME/DDE diagnosis program with the fault symptom "Engine does not start. Work through the test modules offered.



Signal not OK

- U = approximately battery voltage:
Check wiring and repair if necessary. If the wiring is OK: continue fault finding in DME/DDE
- U = approximately battery voltage - 1 V (approx. 1 V lower than battery voltage)
Control units and wiring are OK. Use diagnosis interrogation to ensure that the EWS is cleared.



Signal not OK

The above signal indicates a short to ground or a line break. Check EWS-DME/DDE data link and repair if necessary. If data link is OK, replace EWS control unit.

Matching DME(DDE) - EWS III

In specific cases, it is possible that synchronization between the DME/DDE control unit and EWS control unit may deviate from each other. In these cases, the test module refers to the matching procedure which must then be carried out. In this way, the variable codes of both control units are reset to the common starting value.

This matching procedure must also be conducted when a new engine control unit is installed. In this case, the matching procedure adopts the basic code of the EWS control unit from the DME(DDE) control unit. This basic matching procedure is only possible once.

With this matching it is therefore not possible to adjust DME(DDE) control units - which were adapted in another vehicle with another EWS control unit - to a further EWS control unit.