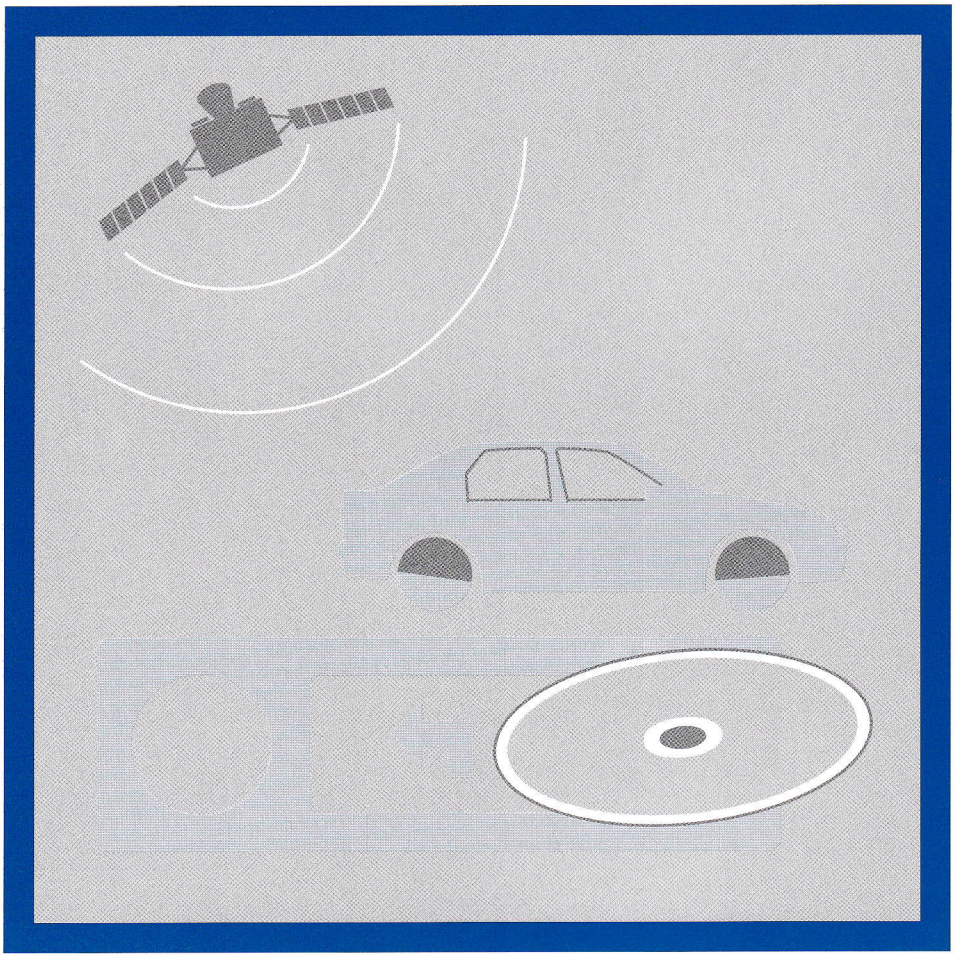
T11

Technical Service Training

Infotainment

Curriculum Training TC4012032H

Service and Diagnostics



Student Information

CG 8013/S en 05/2002

The continued technical development of audio and communications systems is leading to increasing complexity of operation which places ever greater demands on customers and technicians. It is not uncommon for problems with understanding to result in an operator incorrectly assuming a malfunction of the audio system.

The associated problems with diagnostics in service can lead to audio systems being changed when they are not faulty.

This publication shows the individual audio and navigation system components. The description of the systems starts by listing the operations required during the initial commissioning and predelivery inspection.

The publication goes on to describe the dealer menus specifically available with some models and the pin assignment of the connecting plugs.

The complete course on Infotainment comprises two training modules:

- Infotainment "Fundamentals", CG 8012/S, TC4012031H
- **Infotainment "Service and Diagnostics", CG 8013/S, TC4012032H**

Please remember that our training literature has been prepared solely for FORD TRAINING PURPOSES.

Repair and adjustment operations **MUST** always be carried out according to the instructions and specifications in the workshop literature.

Please make extensive use of the training courses offered by Ford Technical Training Centers to gain extensive knowledge in both theory and practice.

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About this publication

- This publication is designed to accompany the course and serve as a work of reference for technicians.
- This publication explains the functions currently available in Ford audio systems. How to operate the individual audio systems is not described in detail in this publication.
- You will find notes on how to operate the systems in the latest "Audio Systems" operating instructions, in the "Electrical Systems" Vehicle Testing and Diagnosis Manual, volume III, in the TIS Technical Information System and in the GSevin database.
- Given the great range of model variants, this publication cannot show every vehicle and model specific detail (e.g. locations of components). However, this will not reduce the overall understanding of the contents.
- This publication cannot and must not take the place of the service literature which is updated regularly in line with advances in the state of the art.

For accurate diagnostics and economical repairs

- Fault-finding by random changing of parts is very expensive, unnecessarily time consuming and therefore does not produce the desired results.
- Time and cost in maintaining vehicles are playing an ever greater part. Customer satisfaction depends increasingly on cost-oriented service.
- Apart from this publication, Ford offers a comprehensive range of service literature. The use of this literature is essential for successful diagnostics and repairs.
- It is also necessary to proceed as specified in the service literature to ensure smooth processing of warranty and policy claims. For this reason, this publication is also designed to prompt intensive use of the available service literature.

General notes on diagnostics with Ford Audio Systems

- Audio systems are vehicle systems which the customer operates every day.
- The operation of the audio systems and the causes of possible malfunctions are not always reproducible by the customer. The reasons for this are not least:
  - the complexity of modern audio systems,
  - the dependence of the radio reception on the transmitters and the environmental conditions,
  - the effect on cassette operation and CD operation of the quality and condition of the cassettes or CDs used.
- Therefore, with customer concerns relating to audio systems, it is particularly important to clarify the circumstances of the concern in as much detail as possible right at the start of diagnostics. This allows early elimination of operating mistakes and environmental factors from the possible causes of the concern.
- This makes it possible to avoid removing and sending in systems in which there is no fault.

Questions on radio operation

- Does the problem occur
  - only during radio operation or also during cassette and CD operation?
  - only when listening to a particular radio station?
  - only when the engine is running?
  - only when driving along a certain route or passing a particular point (e.g. transmitter, mountain)?
- Is the vehicle fitted with additional equipment (e.g. alarm system, etc.) not supplied or recommended by Ford?

Questions on cassette operation

- Does the problem only occur when playing certain cassettes?
- What type are the cassettes used?

Questions on CD operation

- Does the problem only occur when playing certain CDs?
- Does the problem only occur when playing certain pieces of music?
- Does the problem only occur with personally produced CDs?

Note: These questions are only intended to augment the diagnostic procedure in line with the current service literature.

Diagnosing interference

- If customers express concern about interference in the AM waveband, the ground cables in particular must be checked. If necessary, the ground cables must be removed to clean the contact surfaces.

Interference suppression components

- The following interference suppression components can be responsible for interference in the AM waveband:
  - ground strap between the engine and body,
  - ground strap between the hood and body,
  - ground strap between the exhaust system and body,
  - ground strap between the transmission and battery negative terminal,
  - ground strap between the front suspension strut and the battery negative terminal,
  - suppression filter for rev counter signal (the filter is located in the signal lead to the rev counter and suppresses interference from the ignition system in the AM waveband),
  - ignition coil condenser (the condenser is connected to the ignition coil power supply and suppresses interference from the ignition system in the AM waveband),
  - suppression filter for the rear window antenna (suppresses interference caused by the power supply of the heated rear window),
  - condenser for the throttle valve motor (suppresses interference which may be caused by the throttle valve motor in the AM waveband).

Diagnosing interference (continued)

Locating the source of the interference

- If the interference only occurs when the ignition switch is in position I, check all the systems using the circuit diagram and when appropriate disconnect those which are switched on in this position.
- If the interference only occurs when the ignition switch is in position II (without the engine running), check all the systems using the circuit diagram and when applicable disconnect those which are switched on in this position.
- If the interference only occurs while the engine is running, the generator and the ignition system among other things are possible sources of the interference.
- To pinpoint the system concerned, increase the engine speed to 3000 rpm and then switch off the ignition.
- If the interference disappears immediately the ignition is switched off, the interference is due to the ignition system.
- If the interference decreases in proportion with the engine speed, the interference is coming from the area of the generator.
- If the interference is constant irrespective of the engine speed and in particular with VHF (FM) in operation, the electric fuel pump is a possible source of the interference.
- To check the fuel pump, the ignition switch should be turned to position II. Interference from the fuel pump is recognised by the disappearence of the interference after a few seconds when the fuel pump has built up the fuel pressure and is switched off again.
- With some vehicles an interference suppression filter is fitted in the signal lead of the rev counter.
- In the case of spark plugs, make sure that spark plugs with a suppression resistor are used.
- Ignition leads should be checked for corrosion, flash-over damage and chafing and renewed if necessary.
- Bowden cables (e.g. the throttle cable) must never come into contact with the ignition leads.
- The ground connection of the radio connecting plug must be checked with a suitable multimeter. The resistance should not exceed 0.2 Ω. The ground connection must be checked if necessary.

Note: The electrical equipment and sensors forming part of the vehicle equipment, such as for example the fuel pump, have integral interference suppression components and normally do not contribute to interference.

Diagnostics with cassette systems

- Most of the customer concerns which relate to cassette operation fall into one of the following categories:

Sound

- If a customer expresses concern about muffled sound or loss of sound from one or more loudspeakers solely during cassette operation, the cause is probably a dirty sound head.
  - In this case, first a Ford cleaning cassette should be used.
  - If the sound remains muffled, the audio system can be removed and opened and the sound head cleaned with a cotton bud impregnated in isopropyl alcohol.

Note: Refer to the current service literature for the specified procedures for the country concerned.

  - If the sound still remains muffled, the cassette deck must be sent into Ford following the specified procedure.

Note: A dirty sound head is caused above all by particles from ferric oxide cassettes. If possible, customers should only use high quality chromium cassettes and clean the sound head and the audio system regularly with a wet cleaning cassette.

Foreign bodies in the cassette slot

- Loose foreign bodies in the cassette slot are normally visible through the opening for insertion of the cassette or a rattling can be heard when the audio system is removed and turned over.
- If foreign bodies are found, the audio system can be opened if necessary to remove the foreign bodies.

Note: Refer to the current service literature for the specified procedures for the country concerned.

Tangled tape

- Tangled tape means that a cassette or the tape is stuck in the mechanism of the audio system and the cassette can no longer be ejected.
- In this case, the audio system should be sent in to Ford.
- This concern is usually due to a combination of several causes, among other things dirt and the condition of the cassette concerned.

Note: Customers should be told that the use of high quality cassettes with a maximum tape length of 60 minutes (C60) is essential to avoid tape tangles.

Diagnostics with CD autochangers

General

- If a problem (e.g. jumping) always occurs with the same CD or the same piece of music, the cause is probably a faulty (warped, scratched or dirty) CD.
- Problems which only occur on a particular route (e.g. poor roads), can be caused by vibration. The installation of the CD autochamber should be checked.
- If individual CDs are not drawn in, the cause may be a damaged magazine. Magazines are available as separate parts.
- With problems which occur sporadically, the cause may be found in the wiring.

Operating test

- A simple and rapid test procedure checks the main functions of the CD autochanger:
  - Load a CD into position 1 and a CD into position 6 of the magazine.
  - Press the 'CD' button on the audio system. The random play (shuffle) function must not be switched on. The first piece of music on the first CD should now be audible in both stereo channels.
  - Press station button 2. The CD autochanger should recognize that there are no CDs loaded in positions 2 to 5, then the first piece of music on the CD in position 6 should be audible in both channels.
  - After pressing the 'SEEK' button, different pieces of music on the CD in position 6 should be audible in both channels.
  - Eject the magazine.

Magazine is not ejected

- If no sound is heard from the ejection mechanism, there may be an electrical fault. Check the fuse at the back of the audio system, the plug connections on the audio system and the CD autochanger and the wiring.
- If the ejection mechanism audibly starts running, there may be a mechanical fault. A jammed magazine can be released if necessary by introducing a watchmaker's screwdriver or the end of a length of strong wire into the corresponding openings in the housing (refer to the 'CD autochanger' section). It may be necessary to apply gentle pressure on the magazine.

⚠ **Caution** A jammed CD magazine must never be pulled out forcibly. If necessary, the autochanger with the customer's CD or CDs must be sent in to Ford.

Diagnostics with navigation systems

Problems due to transporting the vehicle

- If the vehicle has been transported on a ferry or a vehicle transporter for example, the position data is corrected automatically after travelling a few hundred metres.
- If GPS satellite reception is not possible, the location should be entered manually.

Sensors

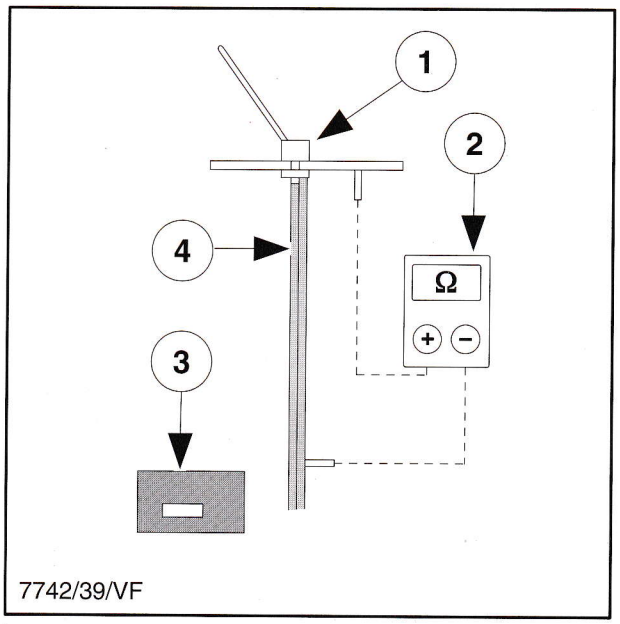
- If wheel sensors are not working correctly, the message "ROUTE GUIDANCE NOT POSSIBLE. PLEASE GO TO A WORKSHOP." is displayed and the ABS warning light in the instrument cluster is illuminated.

Sources of faults during transmission of GPS signals

- If GPS reception is disturbed, navigation is only possible to a limited degree since the system can only access vehicle measurement data and the CD-ROM.
- The following environmental interference can occur:
  - Ionospheric interference
    The speed of the GPS signals is reduced by electrically charged particles in the ionosphere at an altitude of 130 to 200 km.
  - Multipath reception/reflection
    High buildings or cliffs can lengthen the signal transit time through reflection.
  - Signal masking
    Tall buildings, tunnels, topographical features, roof-racks with a load, etc.
  - Effect of the satellite clocks
    The American Ministry of Defense can affect the accuracy of the satellite clocks.

Antenna resistance check

- If radio reception is poor (and the station search facility only finds isolated near and strong stations or none at all), an antenna resistance check should be carried out. However, first, it is important to make sure that the station buttons and loudspeakers are working correctly.
- The screening of the antenna cable must have an intact ground connection. With the antenna cable connecting plug disconnected at the audio system end, a resistance measurement with an ohmmeter should produce a value of less than 0.2 Ω.
- The electrical connection between the middle pin of the antenna connecting plug and the antenna rod or its threaded connection must be in good order. Here, the resistance should not be more than 0.2 Ω.
- The electrical resistance of the connection of the antenna base with the body ground must not be more than 0.2 Ω . If the specified value is not achieved, the ground connection must be checked and cleaned.
- The antenna and the signal lead of the antenna cable must be isolated to ground. The resistance measured from the middle pin of the antenna cable connecting plug to ground should be at least 10 kΩ.
- If the specified value is not achieved, the measurement must be repeated with the antenna base connecting plug disconnected (when present). If the specified value is then achieved, this means there is a short circuit to ground in the antenna base. Otherwise, the short circuit to ground is located in the antenna cable.



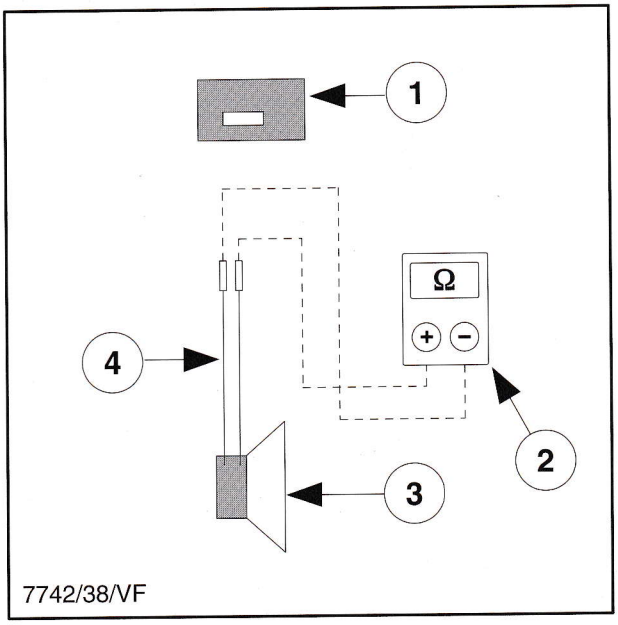
Antenna cable screening resistance check

1. Antenna base
2. Ohmmeter
3. Audio system
4. Coaxial cable

Note: Refer to the current diagnosis and testing manual for precise instructions and for the specified values for the antenna resistance check.

Loudspeaker circuit electrical check

- If the sound from one or more loudspeakers is distorted, although the settings of the audio system (volume, sound and balance controls) exclude the possibility of the loudspeakers being overloaded, an electrical check should be carried out on the loudspeaker system.
- To carry out this check, the loudspeaker circuit must be disconnected at the audio system. The resistance values of the individual loudspeakers and wiring can be measured with the loudspeaker connecting plug disconnected.
- The resistance between the two contacts of a loudspeaker is measured with an ohmmeter. If the system is intact, the measurement should match the rated resistance of the particular loudspeaker (as a rule 4 Ω) plus 0.5 to 1 Ω for the wiring.
- If the specified value is not achieved, the loudspeaker concerned must be made accessible and separated from its wiring. The resistance of the loudspeaker can then be measured directly at the connections without the wiring.
- If the specified value is not achieved, the loudspeaker is faulty. However, if the specified is achieved, the resistance values of the wires must be measured individually.
- The resistance of each wire must be measured between the disconnected connecting plugs of the loudspeaker wiring loom.
- If the measured resistance is greater than 5 Ω, the corresponding circuit must be repaired and the system checked again.

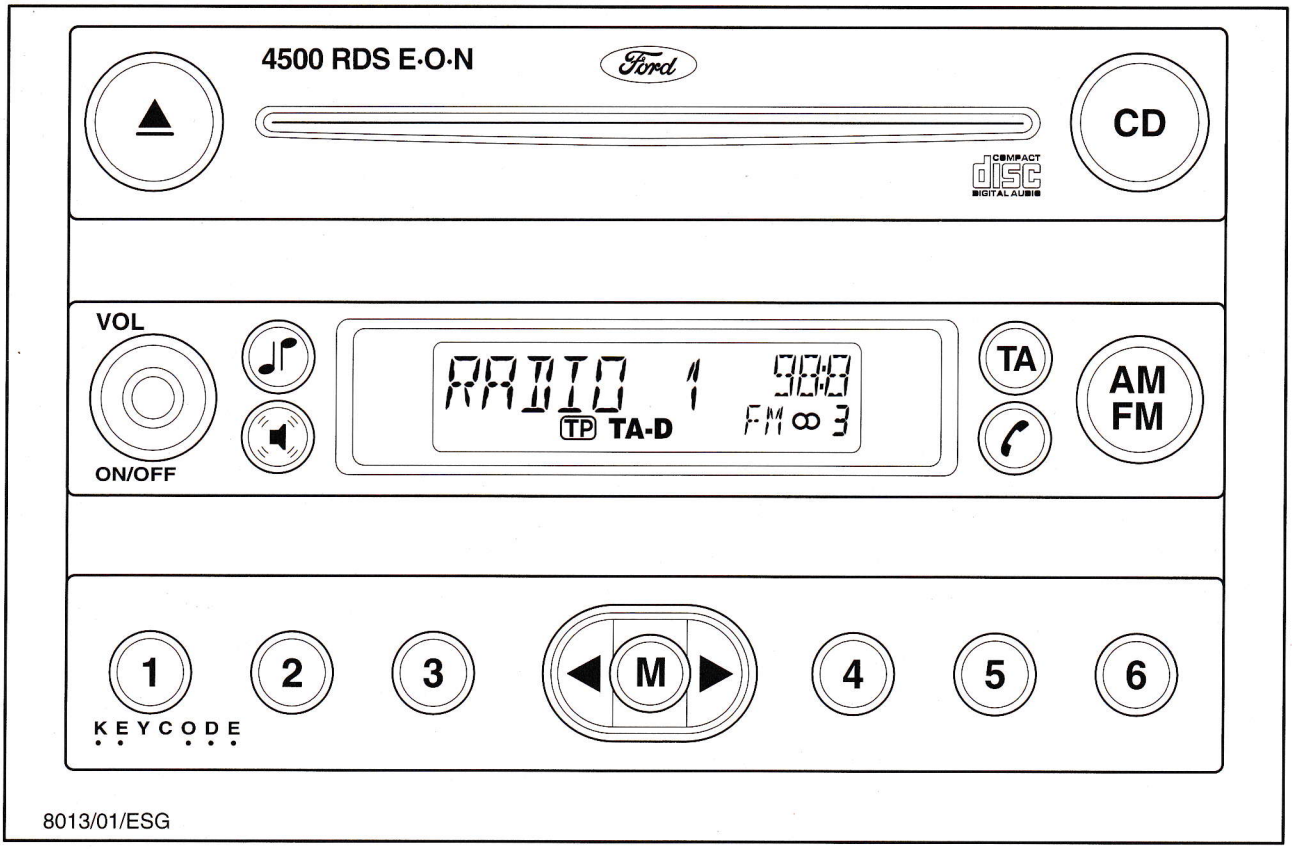


Loudspeaker circuit resistance measurement

1. Audio system
2. Ohmmeter
3. Loudspeaker
4. Loudspeaker wiring loom

Note: Refer to the current diagnosis and testing manual for precise instructions and for the specified values for the loudspeaker circuit electrical check.

2500, 3500, 4500, 6006 ND (2002.25 Fiesta) audio systems



View of 4500

Operations during initial commissioning/predelivery inspection

Entering keycode

- Use station buttons 1–4 for entering the keycode, then confirm with station button 5.
- Further information on entering the keycode is to be found in the section "Locked audio systems", page 26.

Entering VID

- Press button M for two seconds.
- Press button M repeatedly until the VID can be entered.
- Enter the keycode (refer to Entering keycode)
- The audio system is muted and displays the number already stored or a flashing cursor.
- The cursor can be moved in the display with the arrow buttons next to button M. The number is entered with the volume control. Up to 16 characters can be entered.
- Once all the characters have been entered, press button M to confirm. The audio system switches back to normal operation.
- Repeat steps 1 and 2 to check the vehicle identification number.

Tuning in 3 local stations

- Switch to FM, search for the station, press the corresponding station button until the radio is briefly muted, or
- Press the AM/FM button until AST appears in the display. The radio stores the 6 strongest VHF stations and is muted during this operation.

Dealer menu

Continued keycode entry

- Continued keycode entry is possible. For this refer to "Locked audio systems", page 26.
- If the keycode is mislaid, the part number and serial number of the radio concerned are required to request the keycode. The serial number can be shown in the display of the audio systems of the 2002.25 Fiesta.

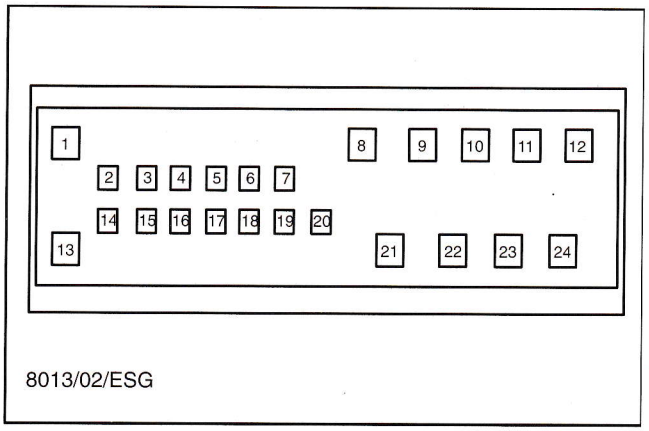
Self-test

- Press station buttons 3 + 6 simultaneously for 2 seconds.
- The system looks for a radio station, then all the loudspeakers are checked in turn.
- For this, the station button 2 must be pressed and held down. Then press button 6. The serial number is shown in the radio display. The following part numbers can be used:

System type	Part number
2500	2S6118K876AE
3500	2S6118K876BE
4500	2S6118C815AE
6006	2S6118C815HA

View of connecting plug

1 Bat +
2 Ign
3 Illum
7 Phone mute
8 LF +
9 LR +
10 RR +
11 RF +
12 RF –
13 Ground
14 AVC
16 Antitheft
17 Keycode dump
18 Rem Analog +
19 Rem Analog –
21 LF –
22 LR –
23 RR –
24 Ground



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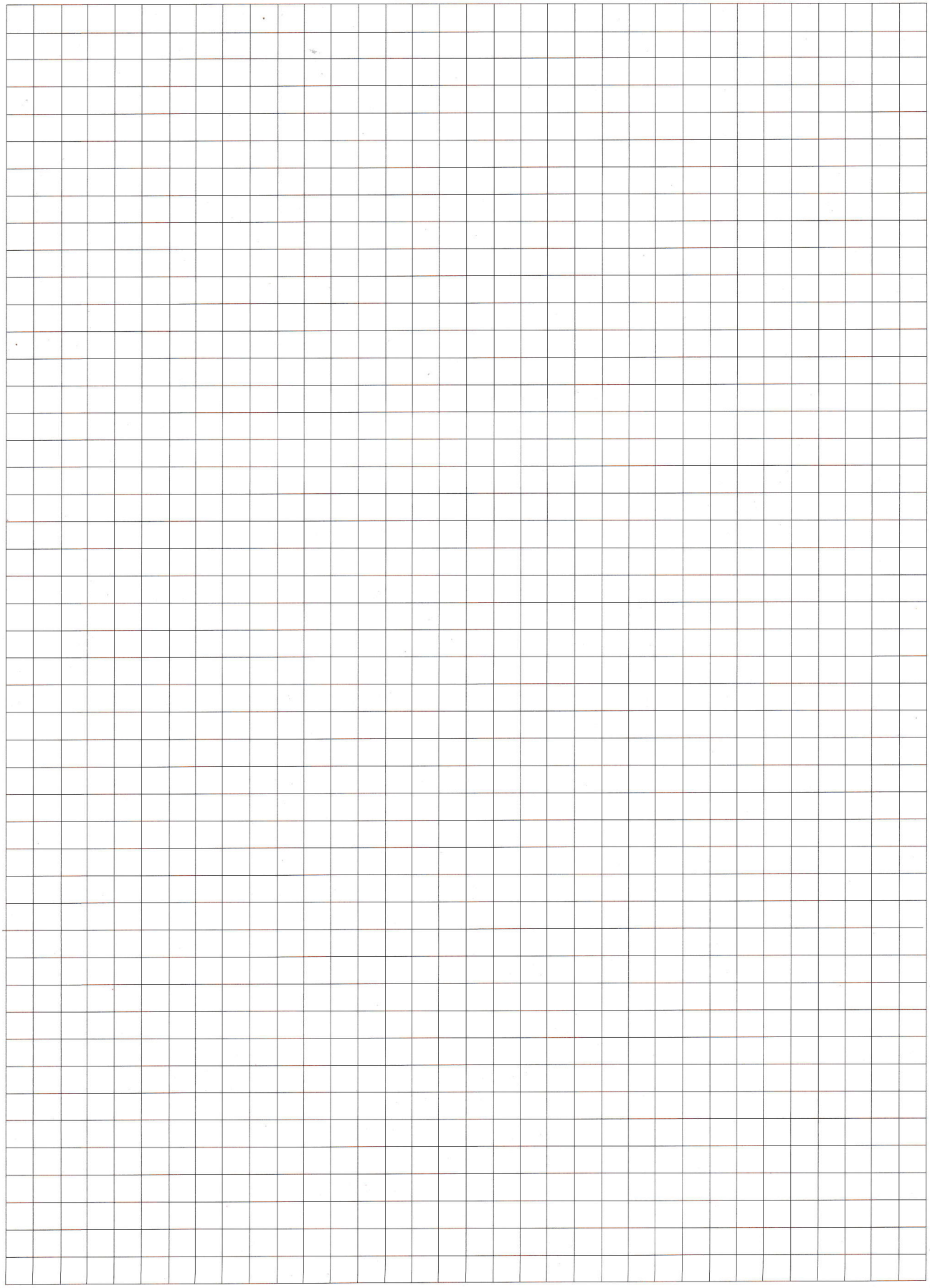
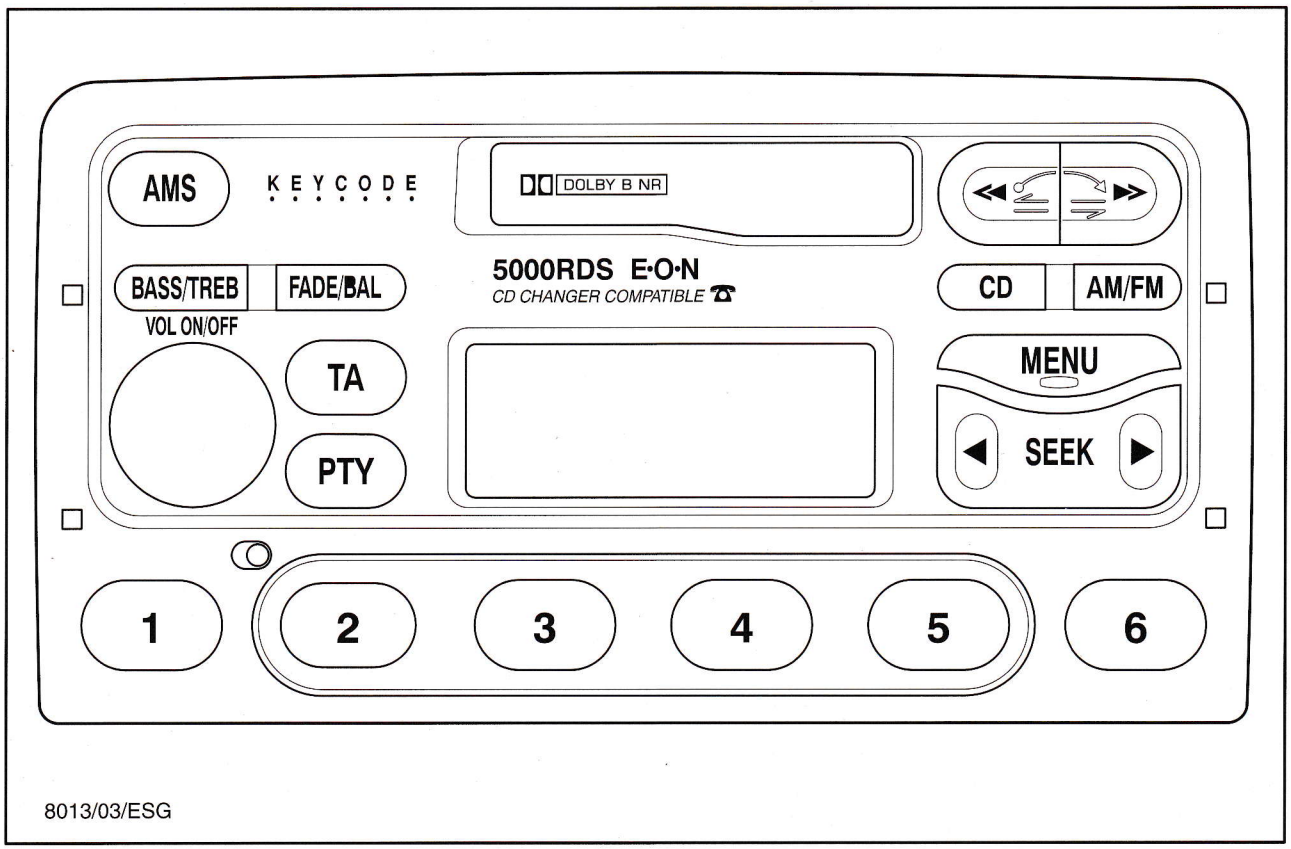
Note: Further information on this subject can be found in the operating instructions, CG 3418.



1000, 2000, 3000, 4000, 4050, 5000, 6000, 7000, 6006E/9006 audio systems



View of radio 5000

Operations during initial commissioning/predelivery inspection

Entering keycode

- Use station buttons 1–4 to enter the keycode, then confirm with station button 5.
- Further information on entering the keycode is to be found in the section "Locked audio systems", page 26.

Entering VID

- Press the menu button for two seconds.
- Press the menu button repeatedly until the VID can be entered.
- Enter the keycode (refer to Entering keycode).
- The entry location can be selected using the seek button.
- The character can be changed with the volume button.
- On completion of the entry, press the menu button to confirm.

Tuning in 3 local stations

- Switch to FM, search for the station, press the corresponding station button until the radio is briefly muted, or
- Press the AM/FM button until AST appears in the display (not 1000 radio). The radio stores the 6 strongest VHF stations and is muted during this operation.

Dealer menu

Diagnostic trouble codes

- There are different diagnostic trouble codes which can be shown in the radio display. Single-digit codes indicate a fault with the 6-CD autochanger; two-digit codes denote a fault in the 6000 CD radio.

Note: Even when a diagnostic trouble code indicates a fault in the system, it is perfectly possible that a damaged wire or poor plug connection could cause this fault.

Error 01	No CD recognition, no display
Error 02	CD recognised, but no command can be carried out
Error 03	Focussing incorrect ⇒ change system
Error 04	Switched off due to temperature, let system cool down
Error 05	Fault in mechanism (system, transport rollers or magazine)
Error 06	All CDs cannot be read
Error 07	The selected CD cannot be read
Error 08	Selected CD is not available
Error 09	Magazine empty
Error 10	Magazine missing
Error 11	Fault in system (6000 CD) ⇒ change radio
Error 12	Laser adjustment incorrect (6000 CD) ⇒ change radio
Error 12 CD	Clean and reload CD, if the fault is still there ⇒ change system
Error 14	Temperature too high
Error 15	Internal fault ⇒ change system
Error 16	Fault during ejection (mechanism faulty)
No CD	CD drawer empty (is displayed for 25 seconds then the next CD is selected)
No Discs	Magazine empty

Self-test

- Press station buttons 3 + 6 simultaneously for 2 seconds.
- The system looks for a radio station, then all the loudspeakers are checked in turn.
- With systems with a two-antenna (diversity) system, the front loudspeakers are checked with the tuner of the roof-mounted antenna, the rear loudspeakers with the tuner of the rear window antenna.

Views of connecting plugs

View of connecting plug block A

1 Bat +
2 Power ground
3 Ignition
4 Illumination +
5 Vehicle alarm
6 Power ground
7 Switched + /Antenna
8 Not used

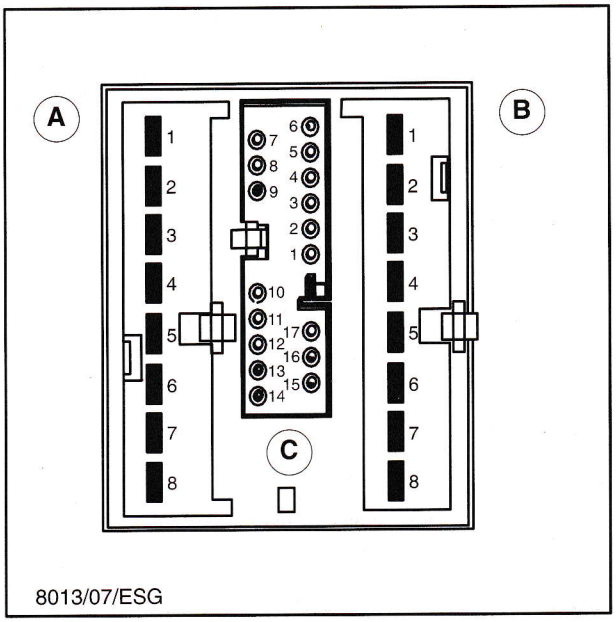
View of connecting plug block B

1 Left front +
2 Left front –
3 Left rear +
4 Left rear –
5 Right front +
6 Right front –
7 Right rear +
8 Right rear –

View of connecting plug block C

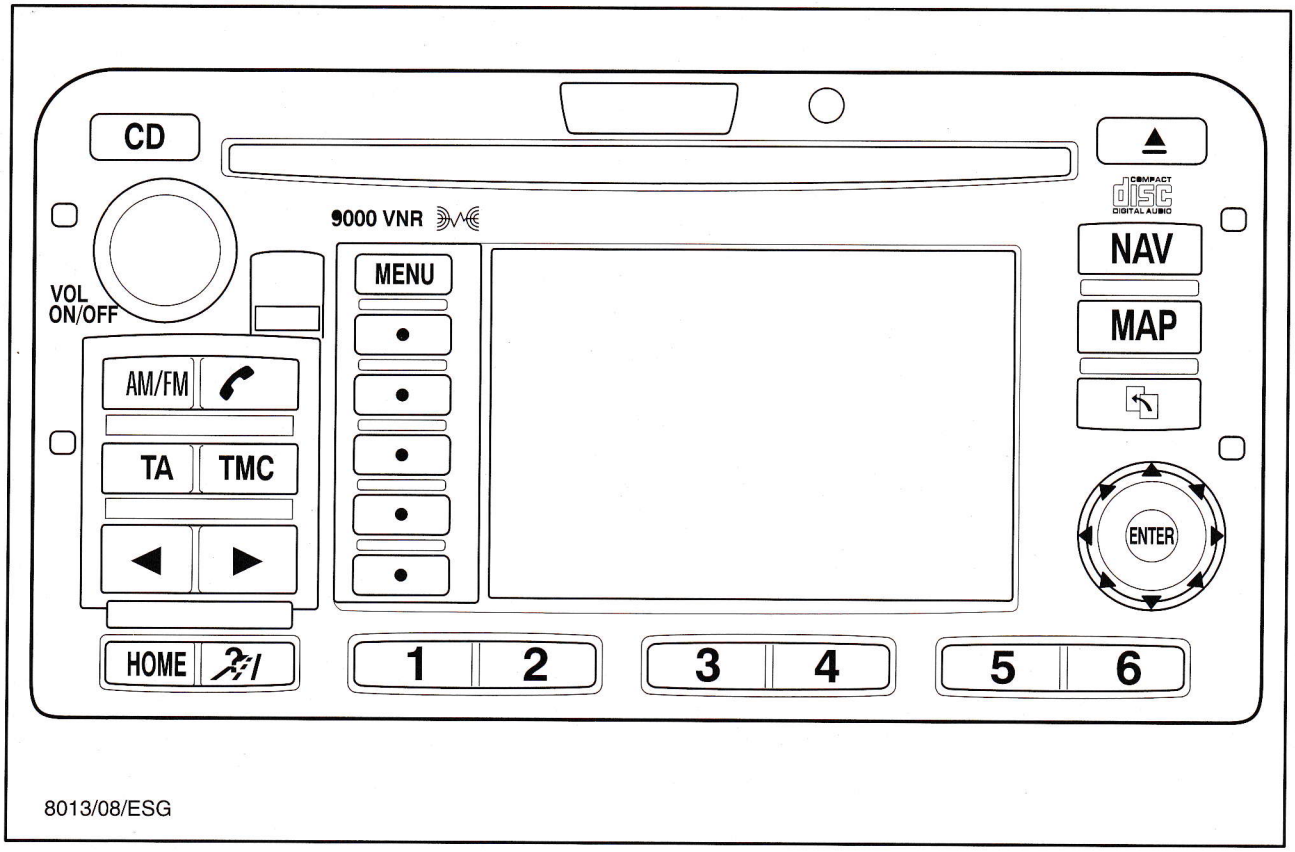
1 ACP +
2 ACP –
3 Parking aid mute
4 Phone mute
5 Ground/phone shield
6 AVC (automatic volume control)

Note: Further information on this subject can be found in the operating instructions CG 3358.



7 Not used
8 Audio #1 Telematics
9 Audio #2 Telematics
10 Telematics
11 Analog remote #1
12 Analog remote #2
13 SCP +
14 SCP –
15 Not used
16 Not used
17 Not used

VNR 9000



Operations during initial commissioning/predelivery inspection

Entering keycode

- Use station buttons 1–4 to enter the keycode then confirm with the OK button or station button 5.
- Further information on entering the keycode is to be found in the section "Locked audio systems", page 26.

Entering VID

- Press the audio button then select the option MORE.
- Enter the keycode (refer to Entering keycode).
- The entry location can be selected with the joystick (center button).
- The character is entered by pressing the joystick.
- On completing entry, press the OK button to confirm.

Tuning in 3 local stations

- Switch to FM, search for the station, press the corresponding station button until the radio is briefly muted, or
- Press the AST button. The radio stores the 6 strongest VHF stations and is muted during this process.

Setting up navigation

- Load the NavTech navigation CD and select the langauge. To do this, press the menu button, select the menu item "Language" with the joystick, choose the required language and then press to confirm.

Note: Further information on this subject can be found in the operating instructions CG 3386 and in TSB 046/2001.

Self-test

- Press station buttons 3 + 6 simultaneously for two seconds.
- The system looks for a radio station, then all the loudspeakers are checked in turn.
- The VNR 9000 has a 2-antenna (diversity) system for radio reception. Only the second input (window antenna) receives the TMC information.

Note: The rear antenna is not suitable for a 100% antenna check. With strong stations, the antenna cable is sufficient as "antenna", but in spite of the test being passed, the connection to the glass can be faulty.

GPS antenna

- The GPS antenna has an integral amplifier which is supplied with power through the internal conductor of the GPS antenna cable.
- During the self-test, only the current to this amplifier is checked. The presence of a GPS signal is not checked.
- Therefore, if the GPS antenna cable is severely crushed or kinked, no GPS signal can be received although the test is OK.

Note: The GPS antenna cable can be damaged by pressure. If the GPS status information is yellow or red, this may indicate a faulty antenna cable.

System diagnostics

- Press button NAV and the safety instructions screen appears (the diagnostic mode can only be activated from this screen).
- Press the joystick up twice and to the right once, then press menu and confirm the text with enter.
- Now the system diagnostics appear underneath the navigation settings.
- Further more it is possible to read out DTC's via WDS.

Note: After the ignition is switched off (position 0) the menu is no longer available.

- The following options are available:

1 **Display**
To check the basic colors.

2 **Distance parameter**
Calibrated by the system, do not change.

3 **GPS**
The GPS test – depending on the reception situation, it can take a few minutes for the display to be updated. The date, time (GMT) and number of satellites are displayed.

4 **Gyro**
The displayed reading in degrees is changed by moving the system.

5 **Gyro factors**
Calibrated by the system, do not change.

6 **Key**
Keypad test

7 **Reverse signal**
Reverse gear

8 **Speed sensor**
Calibrated by the system, do not change.

9 **Voice & sound**
Speech output

10 **CD-ROM status**
Check on CD-ROM drive.

11 **Erase all memory**
The system reverts to the basic works setting. **Warning: This erases all the user data (e.g. address book)**

12 **CD map (RS232 out)**
Only for the purposes of servicing by the manufacturer.

13 **Error log**
Only for the purposes of servicing by the manufacturer.

Note: When the navigation system control unit is changed, the equalizer data should be stored in WDS and then downloaded from WDS to the new module.

CD autochanger

- To release the CD magazine in an emergency, refer to CD autochanger.

Views of connecting plugs

View of connecting plug block A

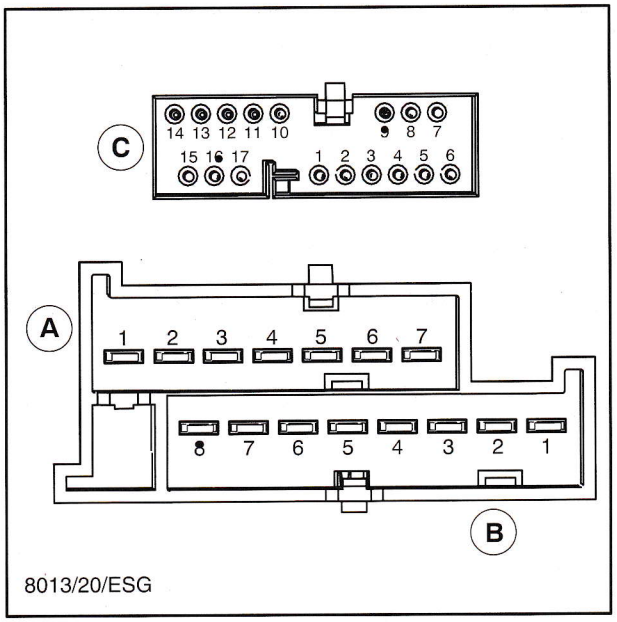
1 Bat +
2 Power ground
3 Ignition
4 Illumination
5 Vehicle alarm
6 Power ground
7 Switched + /Antenna
8 Not used

View of connecting plug block B

1 Left front +
2 Left front –
3 Left rear +
4 Left rear –
5 Right front +
6 Right front –
7 Right rear +
8 Right rear –

View of connecting plug block C

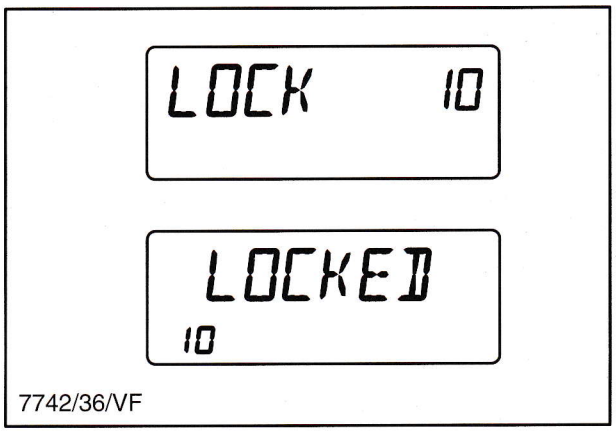
1 ACP +
2 ACP –
3 Parking aid mute
4 Phone mute
5 Ground/phone shield
6 AVC (automatic volume control)



7 Not used
8 Audio #1 Telematics
9 Audio #2 Telematics
10 Telematics
11 Analog remote #1
12 Analog remote #2
13 SCP +
14 SCP –
15 Not used
16 Not used
17 Not used

Locked audio systems

- Basically, most systems allow up to 10 attempts to enter a keycode. If a further attempt is made, the system is locked.
- When this happens, the display (depending on the model) indicates "10", "LOCK" or "LOCKED".
- With some earlier systems with a three-digit keycode, permanent lines appear and not "10" when the system is locked. These systems must then be sent back to Ford.
- However, with the series 3000 – 9000 systems, the dealer can make further attempts to enter the correct keycode.



7742/36/VF

Further attempts to enter keycode

- To do this, switch on the system and turn the ignition key to position I.
- Hold station button 6 down for 5 seconds.
- "CODE" and a series of dashes appears in the display. The system is now ready for a further attempt to enter a correct keycode.
- After the correct code has been entered, the keycode counter is reset to zero.

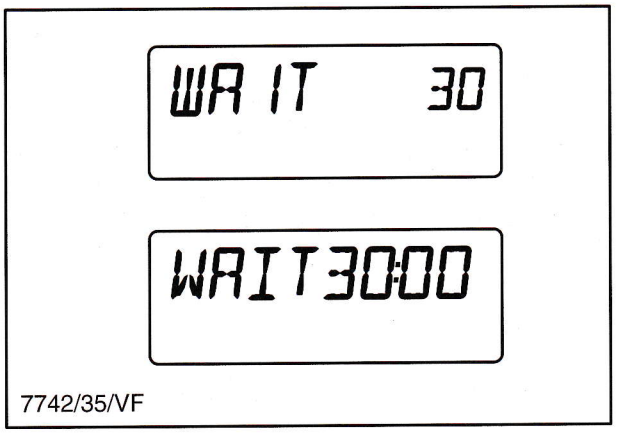
Note: When an incorrect code is entered three times in succession, the system is locked and must be sent in to Ford.

Locked audio systems (continued)

- Audio systems displaying "WAIT 30", WAIT 30M", "HOLD" or a row of permanent dashes, are **not** locked and must **not** be sent back to the manufacturer.

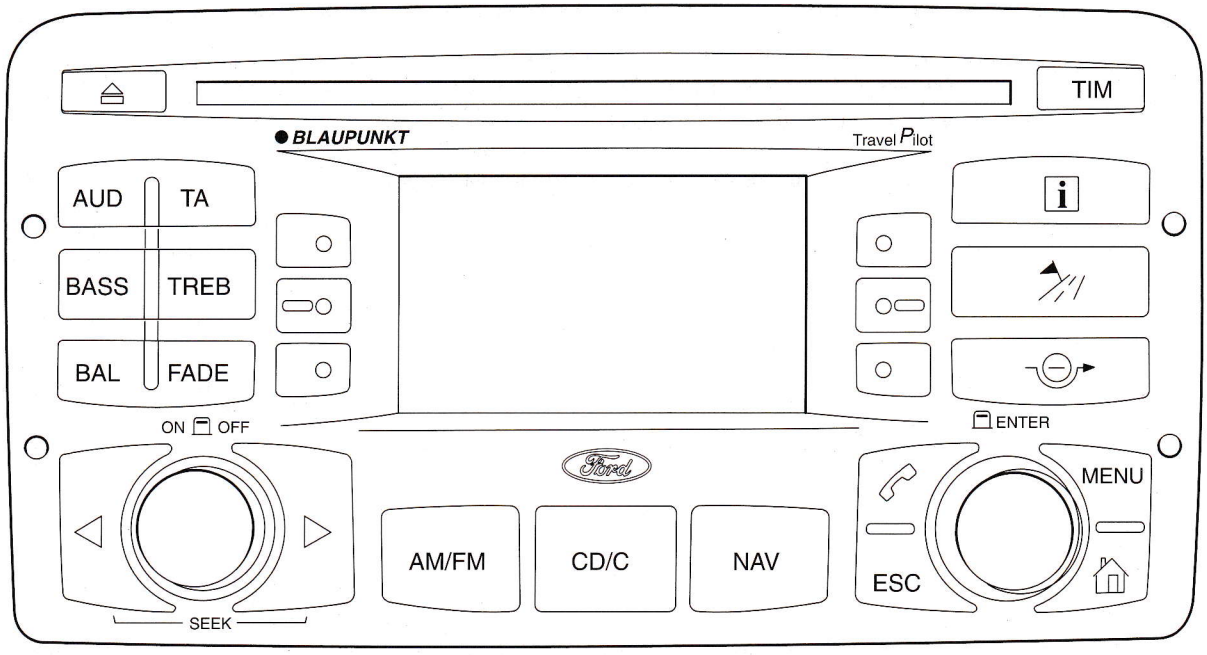
- Here, it is possible to enter further keycodes after a defined time has elapsed:

  – Leave the system switched on and the ignition key in position I. The display will count down to zero in 30 minutes. Then, a new keycode can be entered. Alternatively, on some systems the display shows a row of dashes after 30 minutes. This means that a fresh attempt can be made to enter the keycode.



7742/35/VF

RNS IV



8013/17/ESG

Operations during initial commissioning/predelivery inspection

Entering keycode

- Turn the right-hand rotary knob to select the character and press to enter, then select the tick symbol and press the rotary knob to confirm the complete keycode.

Note: After two incorrect attempts to enter the keycode, the radio is locked for 30 minutes each time. After a total of 10 incorrect attempts (5 x 2), the radio is locked permanently (and the message "SAFE" appears in the display).

- If the keycode is not available, this must be established using the Ford Hotline.

Entering VID

- Not possible.

Tuning in 3 local stations

- Switch to FM, search for the station, press the corresponding station button until the radio is briefly muted, or
- Press the AM/FM button and then the function button "PAGE 2" and select T–store. The radio stores the six strongest VHF stations and is muted during this process.

Setting up navigation

- Load the Teleatlas navigation CD and select the required language. To do this, press the menu button, select the language by turning and pressing the right-hand rotary knob, confirm the language concerned by turning and then pressing.

Note: Further information on this is to be found in the operating instructions CG 3404 and in TSB 034/2001.

Dealer menu

Button combination	Description
S1 + MENU + Power ON	Tuner test mode
S4 + MENU + Power ON	Dealer service mode (only in English) – **Navisimulation:** Allows simulated navigation – **CD eject:** Allows the CD eject button to be locked (e.g. for hire vehicles, demonstration units, etc.) – **FM steps:** This sets the size of the steps for the station search, normally 100 kHz; when cable is connected in Demo stand 50 kHz – **Version:** Indicates different versions (hardware, software, CD-ROM) – **System test:** There is a choice of different tests; the sensor test is important for service – **Display test:** Different patterns are shown on the display, allowing location of individual faulty pixels – **Errors:** This indicates stored faults; this item cannot be selected if there are no stored faults
S6 + ESC + Power ON	Reset to default values **Warning: Erases all data, e.g. address book**
Power ON + S1 + S4 + Info	Reset (triggered by hardware)
Power ON + Phone + NAV	TCU diagnostics (only for Telematics)

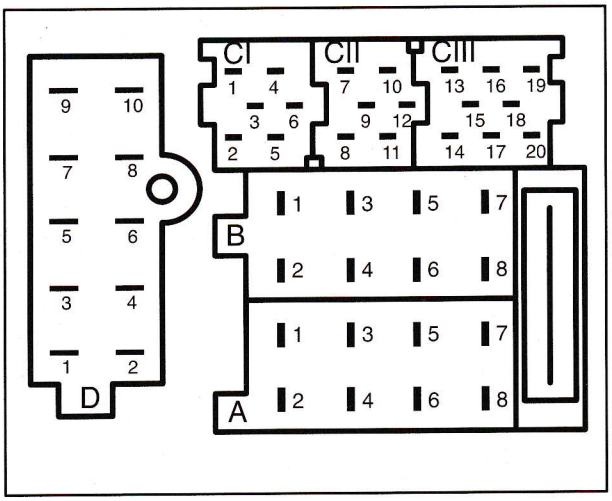
- To exit any menu, switch off the system or press the "ESC" (Escape) button in the main menu. The changed settings are stored when this is done.

Diagnostic trouble code

- No diagnostic trouble codes

Note: From the 2001.50 model year onwards, the RNS IV can also be ordered without a CD autochanger.

Views of connecting plugs



A 1	GALA / VS signal
A 2	Phone mute (active "Low")
A 3	Reverse gear, safe
A 4	Kl. 30, + battery permanent
A 5	U switched, automatic antenna
A 6	Kl. 58g, illumination
A 7	Kl. 15, ignition
A 8	Kl. 31, ground
B 1	Speaker: RR+
B 2	Speaker: RR–
B 3	Speaker: RF+
B 4	Speaker: RF–
B 5	Speaker: LF+
B 6	Speaker: LF–
B 7	Speaker: LR+
B 8	Speaker: LR–
CI 1	Remote control +
CI 2	Remote control –
CI 3	Ground
CI 4	Vehicle alarm
CI 5	Antitheft
CI 6	NC
CII 7	NC
CII 8	NC
CII 9	NC
CII 10	CDC: ACP +
CII 11	CDC: ACP –
CII 12	CDC: Ground
CIII 13	CDC: U switch
CIII 14	CDC: + Battery permanent
CIII 15	CDC: Power ground
CIII 16	CDC: Audio–In L –
CIII 17	CDC: Audio–In R –
CIII 18	CDC: Audio shield
CIII 19	CDC: Audio–In L +
CIII 20	CDC: Audio–In R +
D 1	Ground data/shield
D 2	TCU: ACP 2 +
D 3	CAN (L) MCNET
D 4	TCU: ACP 2 –
D 5	CAN (H) MCNET
D 6	TCU / Phone: AF–IN +
D 7	TCU / Phone: Mute
D 8	TCU / Phone: AF–IN –
D 9	TCU: U switch1 / Asyson
D 10	NC

- In normal operation (when moving forwards), pin A3 must be grounded via the lamp of the reversing light as otherwise the system asks for the keycode every time it is switched on.

- The pins CI 4 and CI 5 form a loop for the anti-theft alarm system.

2060, 2062, 2070, Mondeo 2001 CD autochangers

General

- The CD autochangers have the same electrical connections and the same functionality. Depending on the vehicle, they are installed either horizontally (2060) or vertically (2062).
- The models 2062 and 2070 differ mainly in their height.
- Most problems occur due to damaged wiring and wiring connections, connecting plugs and plug connections.
- If a fault is discovered in the CD system, it is necessary to check the electrical connection between the radio and the CD autochanger.
- A faulty magazine is another possible cause of a fault. The autochanger attempts to play a CD from the magazine three times in succession. Then a diagnostic trouble code appears in the display.
- In the event of a concern, only the new generation magazines should be fitted. These can be identified by a white dot next to the part number.

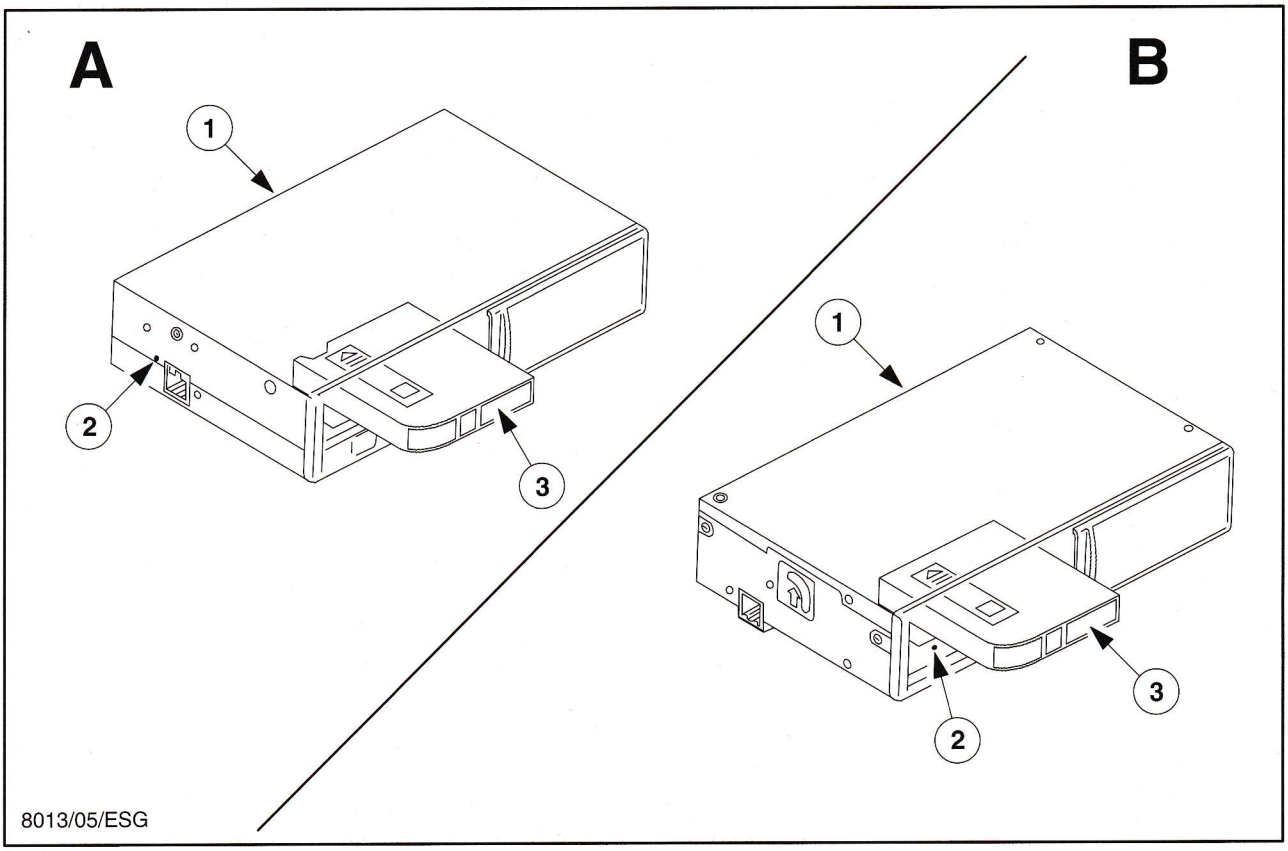
Diagnostics

- During the diagnostic checks, the following components/functions are tested:
  - all the internal circuits
  - all the monitoring devices
  - all the loudspeakers
  - the laser mechanism for the CD player
  - the CD loading mechanism
  - both channels

1 Load a test magazine with one CD in position 1 and one in position 6.
2 Open the magazine slot and remove the CD magazine.
3 Slide the test magazine into the magazine slot.
4 Press the "CD" operating button.
5 The first track on CD 1 should now be played.
6 Make sure that music is audible in both channels for a few seconds, then press the "Preset 2" button.
7 The autochanger now searches through the individual magazine slots until it reaches the slot for CD 6.
8 The first track on CD 6 should now be played.
9 Make sure that music is audible in both channels for a few seconds, then press the "Search upwards" button.
10 The autochanger plays the first few bars of the individual tracks on the CD.
11 Make sure that the music of each track is audible in both channels for a few seconds.
12 Remove the test magazine and reload the original magazine which belongs with the system.

Unlocking autochanger magazine in an emergency

- If the CD autochanger power supply fails or the magazine is jammed, this can be removed by inserting a watchmaker's screwdriver or a strong piece of wire into the housing opening provided for that purpose.
- In the case of the 2062 CD autochanger, the housing opening for ejecting the CD magazine is located at the front underneath the CD insertion slot. In the case of the 2060 CD autochanger, the housing opening is in the side of the housing, as shown in the illustration.



A 2060 CD autochanger (Scorpio)

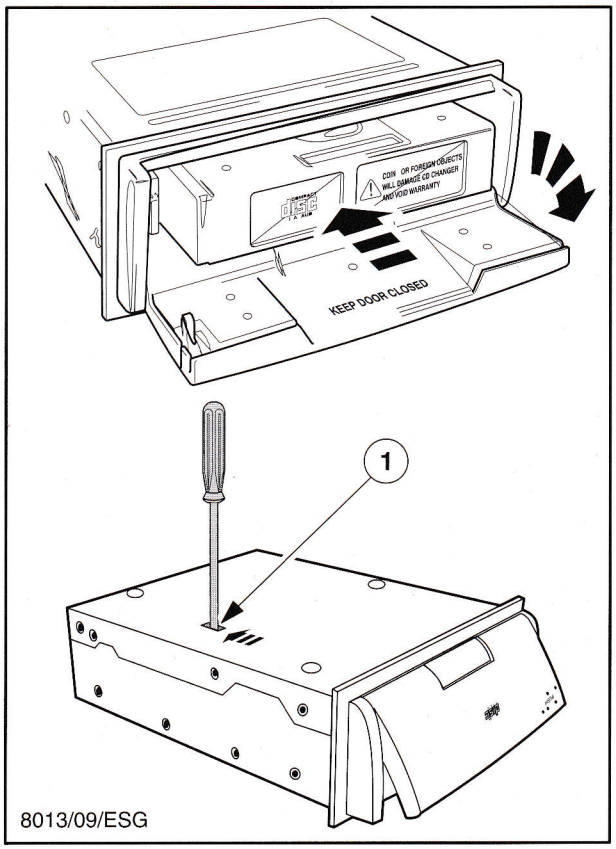
B 2062 CD autochanger (Mondeo, Galaxy, Explorer), 2070 CD autochanger (Focus)

1 CD autochanger housing
2 Opening for emergency release
3 CD magazine

Mondeo 2001 CD autochanger

- The Mondeo 2001 autochanger is designed to be installed horizontally under the front passenger seat.
- This model is compatible with all the audio systems which are available in the Mondeo 2001 and are designed for connection of an external CD autochanger. The exception to this is the Becker system.
- The magazine is released in an emergency through an opening in the underside of the unit. In contrast to the 2060, 2062 and 2070 models, here a lever must be moved.

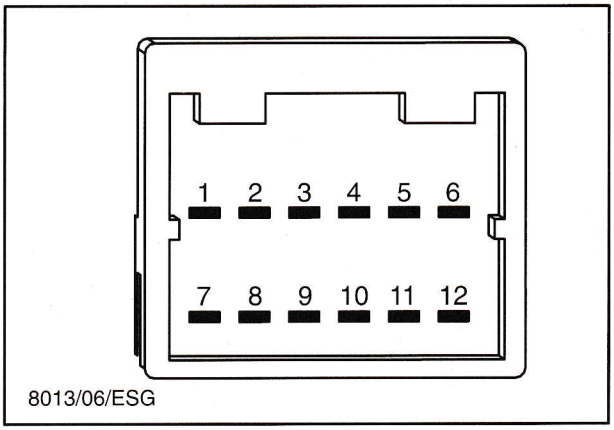
Note: Further information about this can be found in the operating instructions CG 3358.



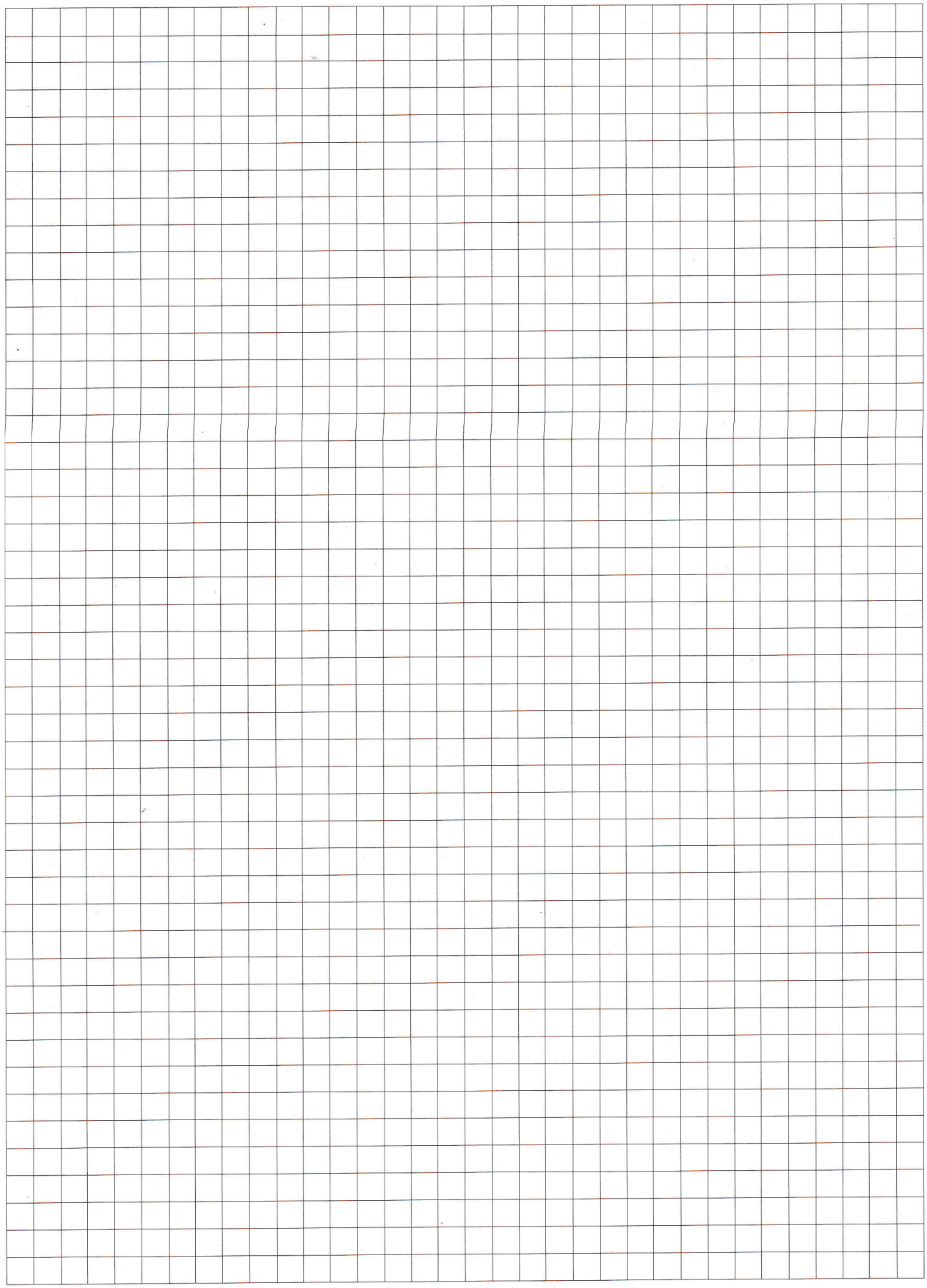
1 Opening for emergency release

View of CD autochanger connecting plug

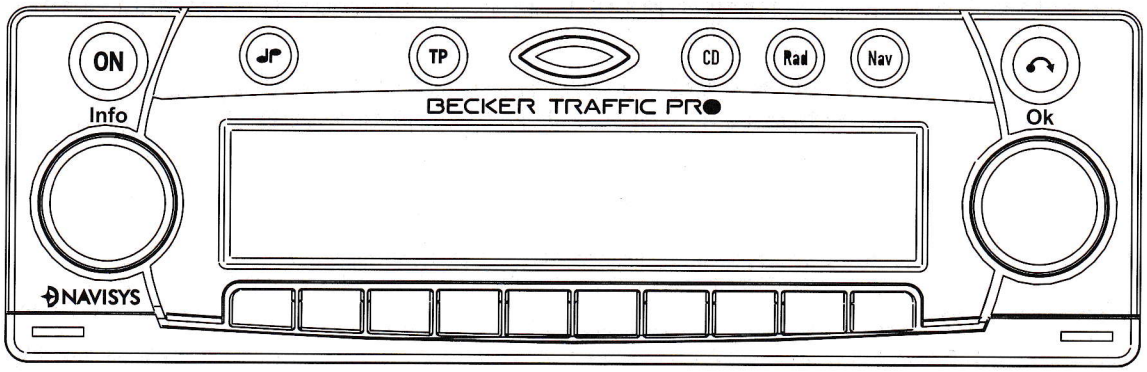
1 ACP +
2 ACP shield
3 Power ground
4 N/C
5 Left audio +
6 Right audio +
7 ACP –
8 ACP enable (CD enable)
9 CD power (battery unfused)
10 Audio shield
11 Left audio –
12 Right audio –



View of CD autochanger connecting plug



Becker Traffic Pro (4730)



8013/11/ESG

Operations during initial commissioning/predelivery inspection

Entering keycode

- Use station buttons 1–7 to enter the five-digit code; after the fifth digit is entered, the system switches on automatically.
- After three failed attempts to enter the keycode, the radio is locked for further attempts for 60 minutes.
- A further three failed attempts lock the system for a further 60 minutes.

Entering VID

- Not possible.

Tuning in 3 local stations

- Switch to FM, search for the station, hold down the corresponding station button until the radio is briefly muted.

Setting up navigation

- Load the Becker navigation CD (NavTech, not compatible with VNR 9000) and select the language. To do this, press the NAV button twice, select the language by pressing and turning the right-hand rotary knob, turn and then press to confirm the selected language.

Dealer menu

Continued keycode entry

- This is not applicable as the keycode can be entered an unlimited number of times.
- If the keycode is not available, contact the Becker Hotline on +49 7248 / 711 777. On completing and sending in a form, the keycode will be supplied in one or two days for a charge.

Workshop mode

- Press the Nav button twice, then the station buttons 3 + 5. Turn the right-hand rotary knob to the desired item (function) and press to confirm.
- In workshop mode the following functions can be selected:

GPS INFO

- In the GPS INFO workshop mode the operation of the GPS antenna is checked. If the GPS antenna is working correctly, the number of received satellites (e.g. 5), date and time (e.g. 13.03.99 14:56:08) and the kind of location possible at that moment FIX: (e.g. 3D) are indicated.
- At least FIX 2D is necessary for successful and rapid calibration. Some time can elapse until this value is obtained (do not move the vehicle during this time).
- To exit the GPS test, press the NAV button. The system jumps back to the workshop mode.

CALIBRATION

- In the CALIBRATION workshop mode the calibration status (e.g. STATUS: 2), the kind of location (e.g. 3D) and CALIBRATION are indicated. After CALIBRATION is completed, the road along which the vehicle is currently travelling (provided this is digitized) is indicated in place of calibration.

Erasing the calibration

- If the navigation system is removed from one vehicle and installed in another vehicle, the calibration must be carried out. However, for this, the current calibration data must be erased.

CALIBRATING TRIP

- After initial commissioning, a calibrating trip is necessary. During this, the speedometer signal (GAL) is automatically adjusted to the vehicle-specific data and the gyro sensors to the equipment location.
- The trip to be completed depends on the type of vehicle and local conditions.
- The navigation system is only ready for use after completion of this calibrating trip and reaching calibration status 3.

Workshop mode

MODULE TEST

- In the MODULE TEST workshop mode the operation of the internal components is checked.

SENSORS

- In the SENSORS workshop mode the operation of the GAL signal, the reverse signal and the internal sensors is checked.
- Engage reverse gear to check the operation of the reverse signal.
- The number following REVERSE: must jump from 0 to 1 (1 to 0).
- To check the operation of the internal sensors, negotiate a bend:
  the values following X: and Y: must change.
- To exit the SENSORS test, press the NAV button. The system jumps back to the workshop mode.

SPEECH TEST

- A loudspeaker test is carried out in the SPEECH TEST workshop mode.

DEMO MODE

- The DEMO MODE is intended for demonstration purposes. The system is assigned a fixed location (Werderstrasse in Hamburg).

VERSION

- The level of the navigation CD is indicated in the VERSION workshop mode.

RESET

- Press station buttons 1 + 3 together to carry out a RESET.

Note: All the data is erased (e.g. address book).

Diagnostic trouble codes

- No diagnostic trouble codes.

Note: Further information on this can be found in the operating instructions, in the installation instructions and in Ford Partner Bulletin No. 36.

Particular points

- Once the corresponding navigation data has been loaded, the navigation CD can be removed and an audio CD loaded and played.
- If a car phone with a hands-free facility is also installed, the loudspeaker output can be switched through the radio loudspeakers. To do this, connect the loudspeaker of the hands-free system to pins 13 + 14 in chamber C2.

Views of connecting plugs

Chamber A

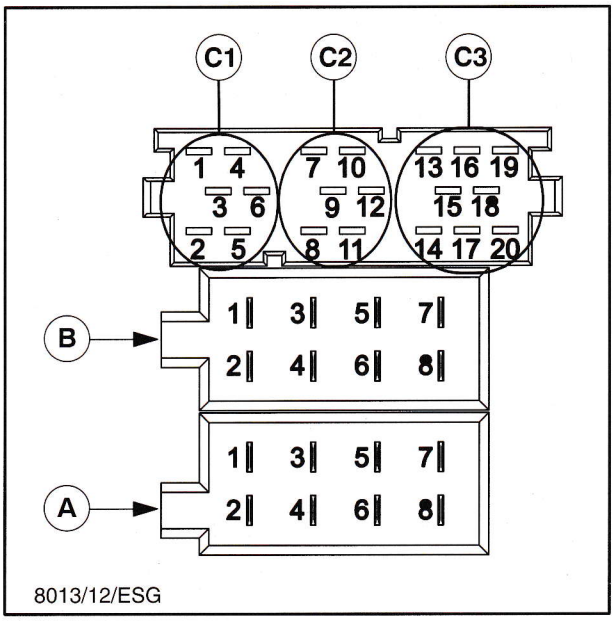
1 Speed signal (GAL)
2 Signal from reversing light switch
3 Telephone muting /hands-free
4 Permanent battery positive (terminal 30)
5 Control output for automatic antenna/amplifier
6 Lighting (terminal 58)
7 Switched positive (terminal 15)
8 Ground (terminal 31)

Chamber B

1 Speaker, rear right +
2 Speaker, rear right –
3 Speaker, front right +
4 Speaker, front right –
5 Speaker, front left +
6 Speaker, front left –
7 Speaker, rear left +
8 Speaker, rear left –

Chamber C1

1 Line out, rear left
2 Line out, rear right
3 NK ground
4 Line out, front left
5 Line out, front right
6 Subwoofer line out



Chamber C2

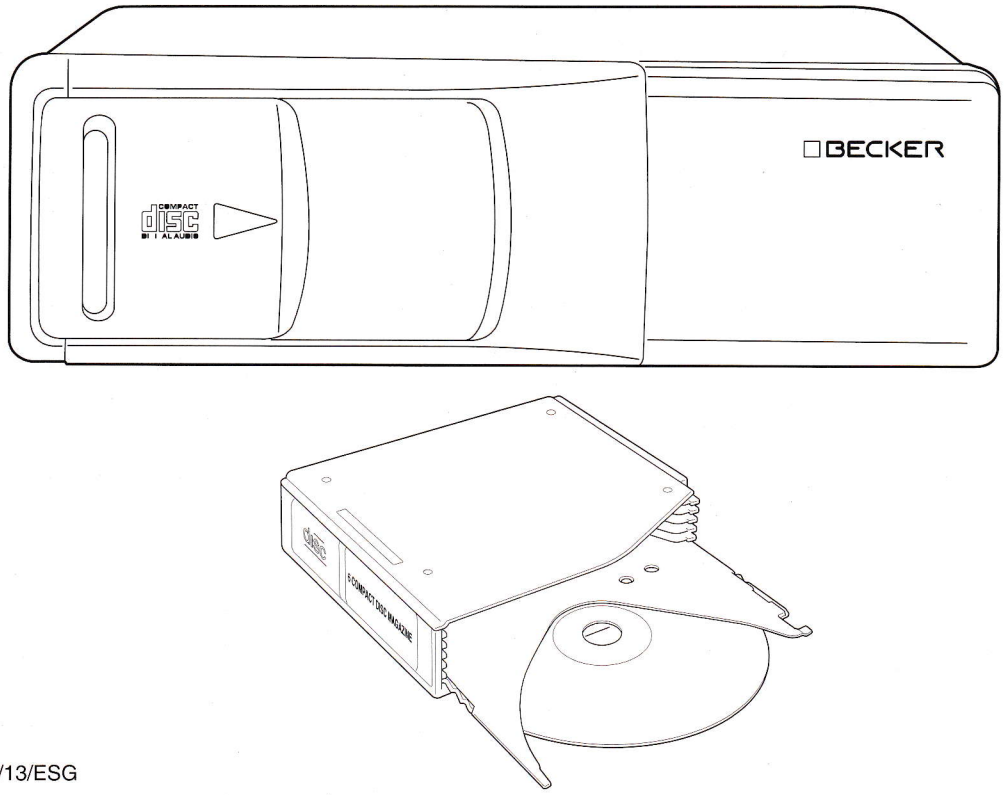
7–12 Specific connector for Becker CD autochanger

Chamber C3

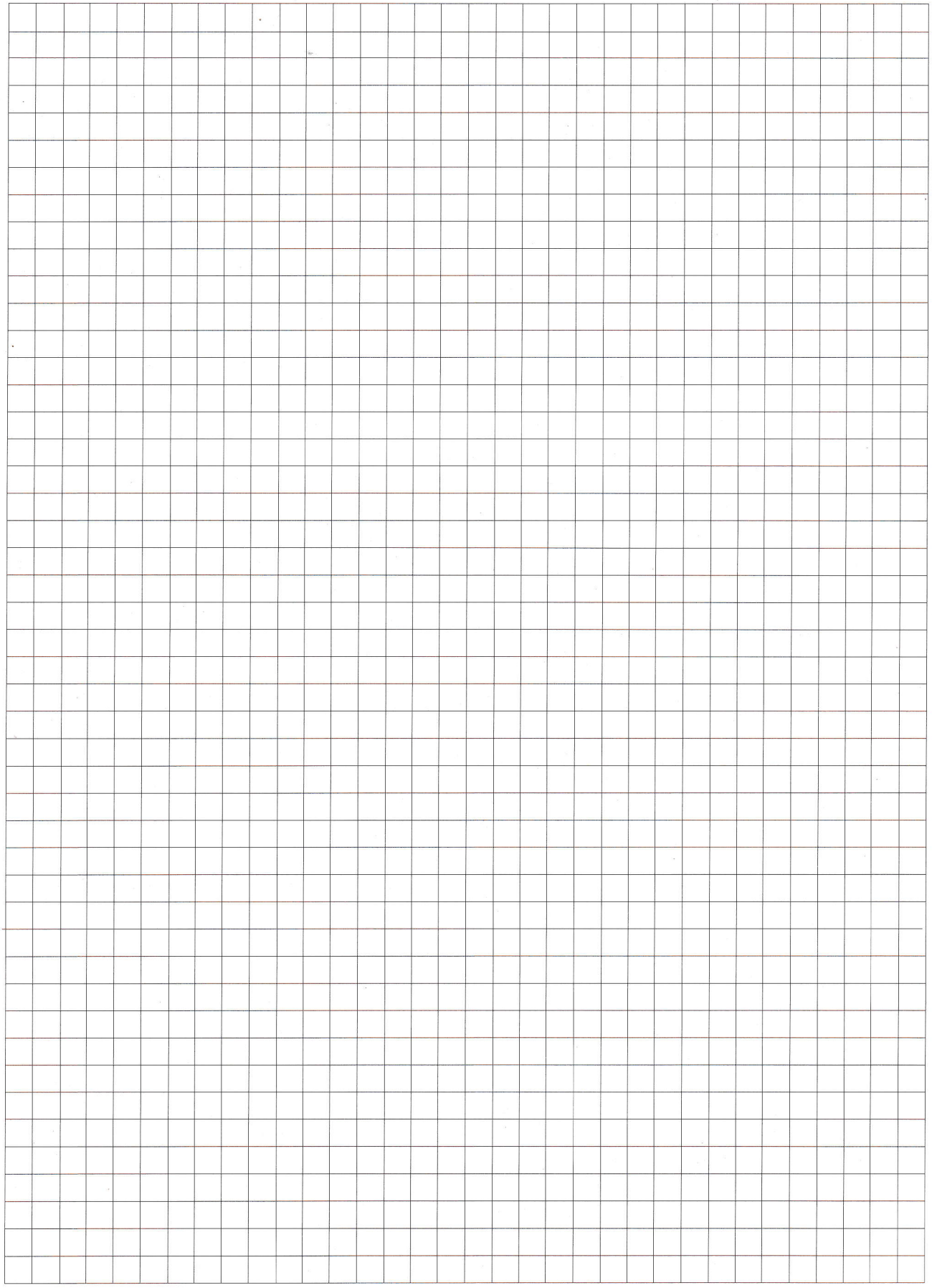
13 NF telephone input
14 Ground telephone input
15–17 Specific connector for Becker CD autochanger
18 CD NF ground
19 CD NF left
20 CD NF right

CD autochanger

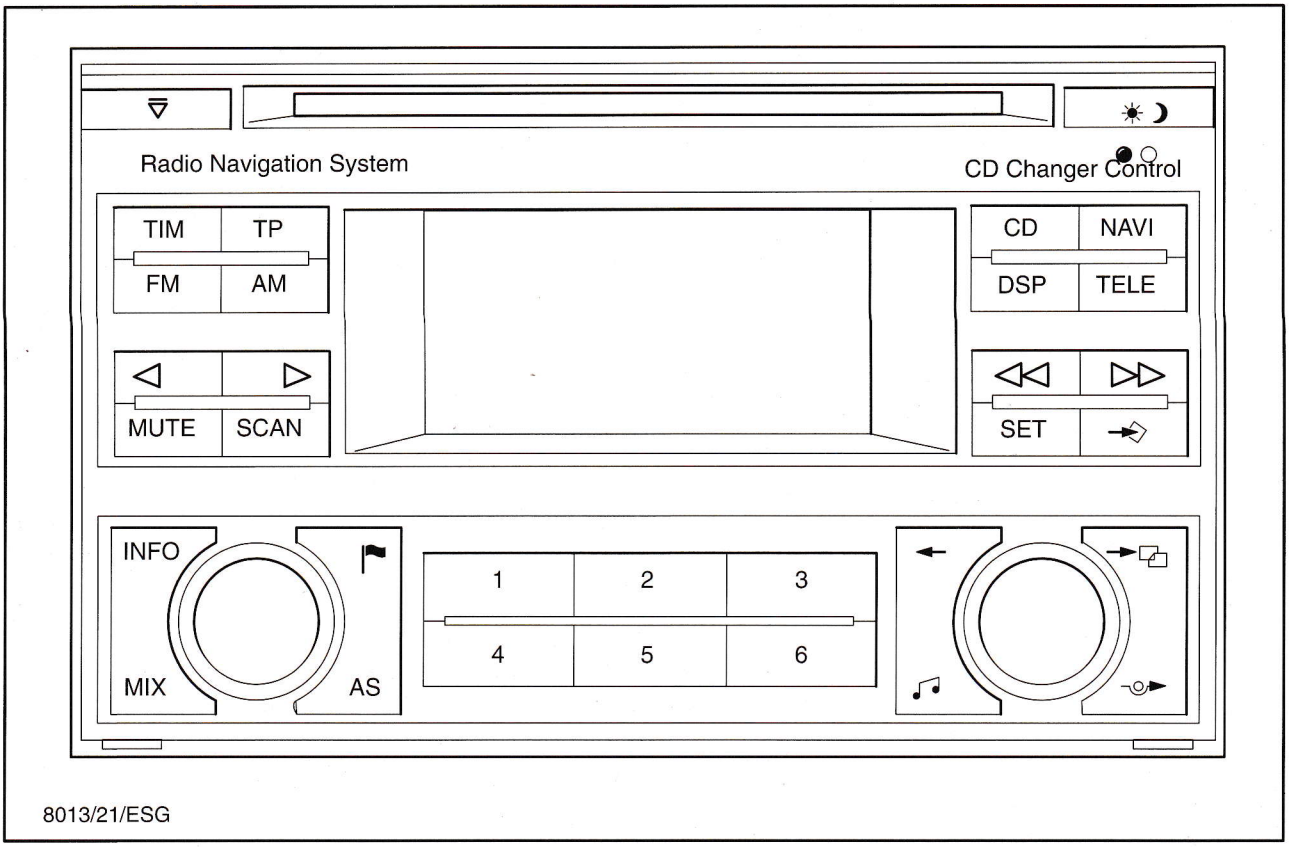
- A 6-CD autochanger is available in addition to the unit supplied with the Becker Traffic Pro. The autochanger kit no. 1114 377 includes the autochanger and the required connecting cables.



8013/13/ESG



Galaxy navigation system 2 (monochrome display)



Operations during initial commissioning/predelivery inspection

Entering keycode

- Use station buttons 1–4 to enter the keycode. Turn the right-hand rotary knob to confirm the complete keycode.

Note: After two failed attempts at entering the keycode, the radio is locked for 60 minutes each time. The radio is not locked permanently, even after repeated failed attempts at entering the keycode.

Entering VID

- Not possible.

Tuning in 3 local stations

- Switch to FM, search for the station, press the corresponding station button until the radio is briefly muted, or
- Press the AS button; the radio stores the 6 strongest VHF stations and is muted during this process.

Setting up navigation system

- Load the Teleatlas navigation CD and select the language. To do this, press the Set button, select the language by turning and pressing the right-hand rotary knob, turn and then press to confirm the selected language.

Dealer menu

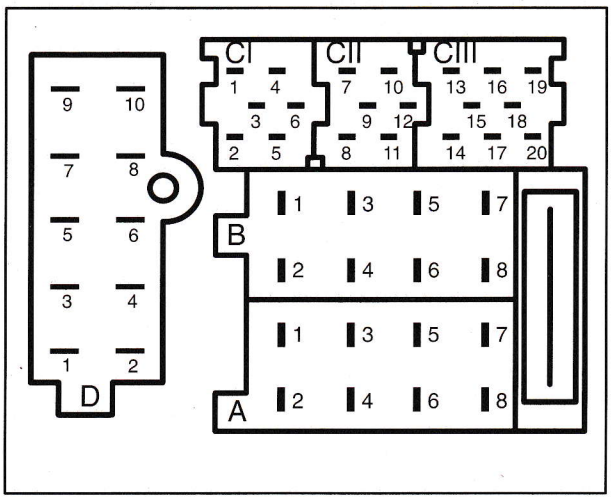
Continued keycode entry

- This does not apply as the keycode can be entered an unlimited number of times.
- If the keycode is not available, this must be obtained via the Ford Hotline.

Particular points

- If the vehicle is equipped with a trip computer, the driving direction arrows are shown in the display of the trip computer.
- In the 2000.75 Galaxy (V191) the connecting cable to the CD autochanger is no longer fitted in production. The Finis Code for vehicles with a Blaupunkt navigation system is 1100898.
- The Finis Code for vehicles without a navigation system is 1014804.

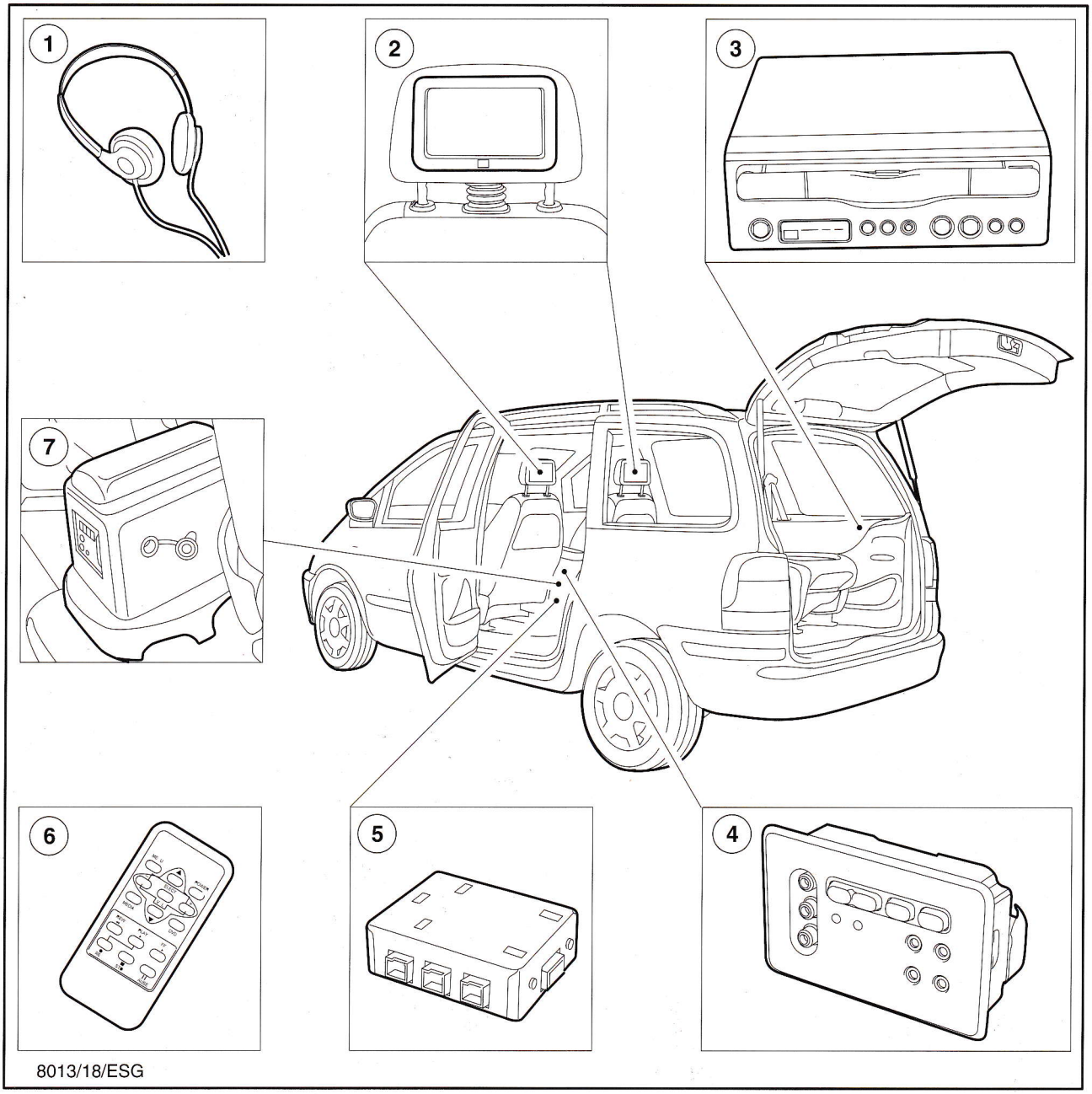
Views of connecting plugs



A 1	GALA / VS signal
A 2	Phone mute (telephone operation)
A 3	Self-test / communications lead
A 4	Connection for switching on/off controlled by ignition key
A 5	Control signal for anti-theft protection, SAFE
A 6	Terminal 58g, lighting
A 7	Terminal 30, + battery positive
A 8	Terminal 31, battery ground
B 1	Speaker: RR +
B 2	Speaker: RR –
B 3	Speaker: FR +
B 4	Speaker: FR –
B 5	Speaker: FL+
B 6	Speaker: FL –
B 7	Speaker: RL+
B 8	Speaker: RL –
CI 1	Not assigned
CI 2	Not assigned
CI 3	Line out, ground
CI 4	Line out, left front, LF
CI 5	Line out, right front, LR
CI 6	Switched positive for DSP
CII 7	Telephone input signal TEL +
CII 8	Duplicate display, CLOCK
CII 9	Duplicate display, DATA
CII 10	Duplicate display, ENA
CII 11	Remote control
CII 12	Telephone input signal TEL
CIII 13	CD autochanger, DATA IN (data to radio)
CIII 14	CD autochanger, DATA OUT (from radio)
CIII 15	CD autochanger DATA CLOCK
CIII 16	CD autochanger power supply
CIII 17	CD autochanger control signal
CIII 18	CD autochanger, left and right channel, ground
CIII 19	CD autochanger, left channel, CD/L
CIII 20	CD autochanger, left channel, CD/L
D 1	CAN-bus ground for DSP system
D 2	Speech ground (driving instructions)
D 3	CAN-bus LOW for DSP system
D 4	Speech NF positive (driving instructions)
D 5	CAN-bus HIGH for DSP system
D 6	Speech NF minus (driving instructions)
D 7	Not assigned (option for Telematics)
D 8	Ignition (terminal 15)
D 9	Not assigned (option for Telematics)
D 10	Signal for reverse gear

Note: Further information about this can be found in the operating instructions CG 3381.

Galaxy and Mondeo multimedia system



View of multimedia system in Galaxy

1 Headset
2 Screen in front seat head restraints
3 Video recorder (in luggage compartment behind right-hand side trim panel)
4 Control module (in center console in rear footwell)
5 Plug & play connection options for all conventional audio visual units (AV units), games consoles, DVD and MP3 players
6 Remote control
7 12V connection plug for power supply to a games console (DC/AC inverter for 12V/220V needed).

Operations during initial commissioning/predelivery inspection

Entering keycode

- Refer to the radio concerned.

Entering VID

- Refer to the radio concerned.

Predelivery inspection

- Check on accessories:
  - Covers 2x
  - Remote control 2x
  - Headset 2x

1 Turn ignition key to position II.
2 Switch on radio (to switch on the multimedia system).
3 Check the batteries of the two remote controls. Change these if necessary.
4 Plug the headsets into the sockets provided on the console.
5 Press the "POWER ON" button on the remote control.
6 Press the "MENU" button on the remote control.
7 With the remote control select the VIDEO MODE on both screens. The screen should now appear in BLUE.
8 Slide a prerecorded video cassette into the video recorder. It should then start playing.
9 Set the volume with the lever on the control unit. Repeat the operation with the remote control.
10 Remove the video cassette.
11 Switch the ignition off. The multimedia system should switch off automatically after about 30 seconds.

Diagnostic trouble codes

- No diagnostic trouble codes.

Operation

- Video films can be viewed and video games played on the two monitors installed in the head restraints – in particular, both are possible at the same time. While a video can be viewed on one screen, a video game can be running on the other monitor independently of this.

- Both screens are equipped with infrared sensors and are only operated with a single remote control. This remote control emits its signal directly to the monitor at which it is pointing.

- The system incorporates a circuit which prevents the two monitors reacting to the remote control signal at the same time so the remote control only controls the screen at which it is pointing.

Operation (continued)

- The remote control allows the audio and picture transmitting equipment to be adjusted to the individual requirements of the viewers or listeners through their respective menus. For example, the size of the video picture can be set optionally to "widescreen" or another format.

- An "ultra-high" resolution of 340,000 pixels ensures a pin-sharp picture. The brightness of 400 candela is two or three times that of a laptop monitor.

- The thin film transistor (TFT) monitors are covered with a special coating guaranteeing performance and safety.

- The coating scatters the incident light for a viewing angle of 140 degrees. This ensures that the pictures shown on the monitor can be seen by all the passengers in the rear seats.

- The picture is still sharp even when sunlight falls directly on the screen. The coating also prevents the monitor splintering in a collision. As the monitors are positioned at headheight, they meet the requirements of the European "crash test" directive.

- The monitors can be protected against theft with special covers.

- The range of operating languages includes English, French, Spanish, German and Italian, and the language can be selected independently for each monitor.

- About 30 seconds after the ignition is switched off, the multimedia system is run down. To obtain the "one hour mode", the system must be switched on again after the ignition is switched off.

Video recorder

- VHS video recorder

- Designed especially for motoring

- Moisture sensor

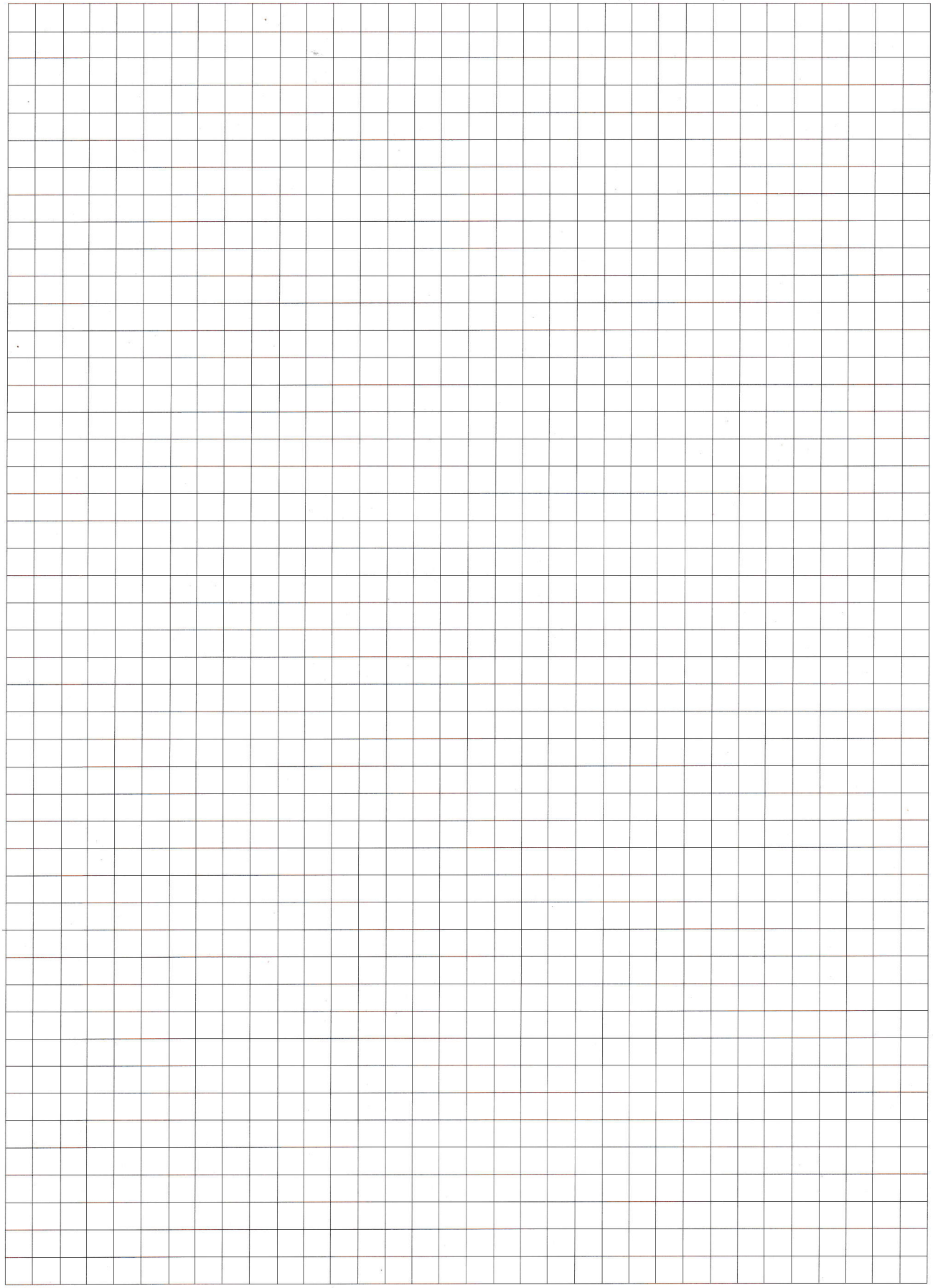
Control module

- Located in the center console between the two front seats.

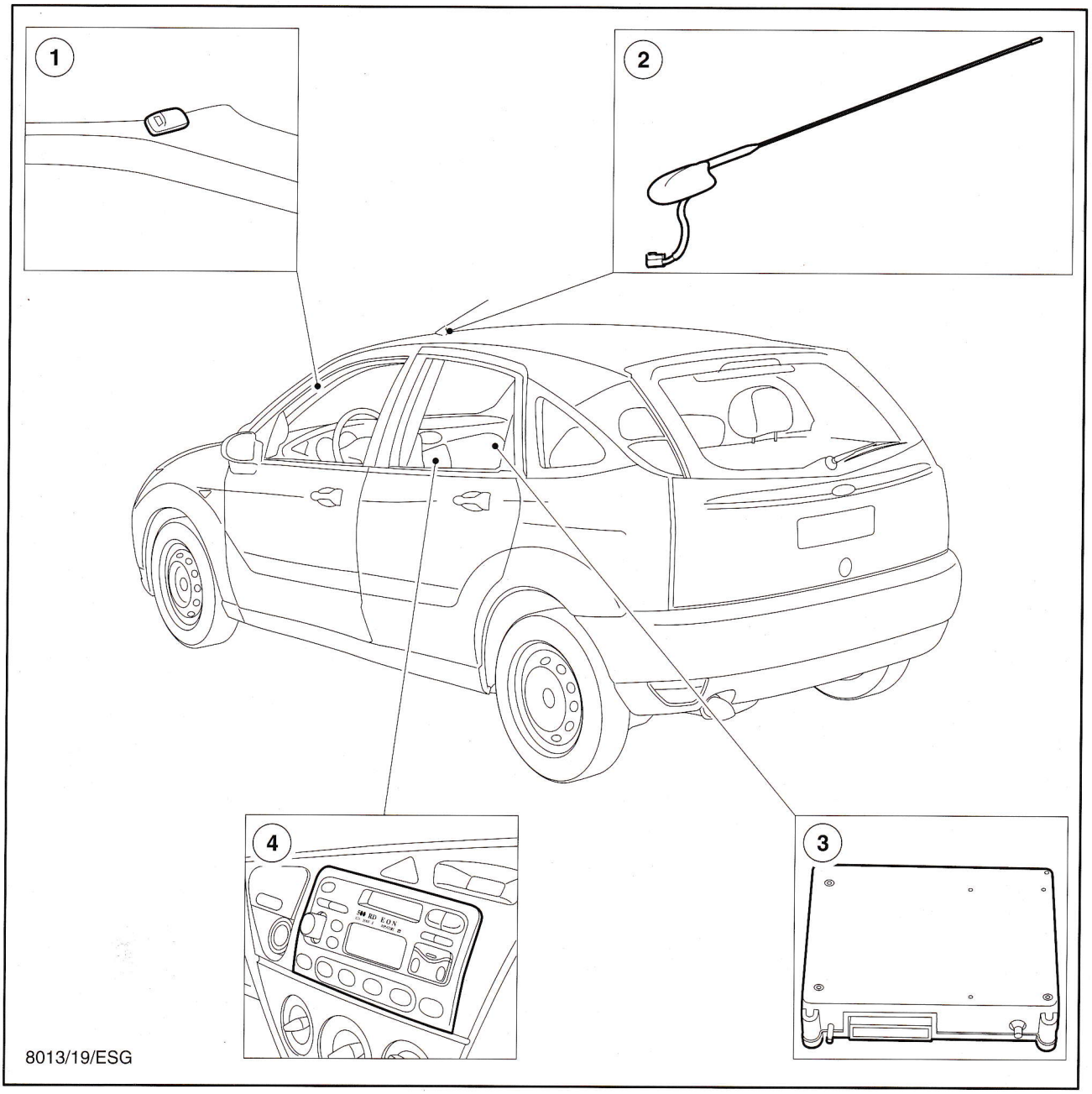
Voltage transformer

- A DC/AC inverter for 12V/220V, 100 W or 150 W for connection to the cigarette lighter, is needed for the power supply for a games console.

Note: Further information about this can be found in the operating instructions CG 3385, in the installation instructions for the kit and in TSB 004/2001.



Telematics



1 Microphone
2 Triplex antenna
3 Telematics control module
4 Telematics-compatible audio unit

Operations during initial commissioning/predelivery inspection

- Make sure that the VIN visible in the windscreen is the same as the VIN in the vehicle papers.
- Switch on the radio and wait at least 30 seconds.
- Press the MENU button once and then button "5" twice to establish a connection with a voice recognition system.
- When requested, say "OPERATOR". This establishes a connection with the Ford Telematics call centre (operator).
- Then tell the operator the VIN of the vehicle. This allows comparison of the VIN with the telephone number on the SIM card.

At the end of a call, hang up by pressing the MENU button again and switch off the radio. When the vehicle is delivered to the customer, activate the system as follows:

- Switch on the radio and wait at least 30 seconds.
- Press the MENU button once and then button "5" twice. This establishes a connection with a voice recognition system.
- When requested, say "OPERATOR". This establishes a connection with the Ford Telematics call center (operator).
- The customer should give the operator the required information.
- The operator will give the customer the telephone number of the Ford Telematics call center and instructions as to how to activate the system.
- Make a note of the telephone number and hang up by pressing the MENU button and switching off the radio. The customer should carry out the activation process in person. This is done as follows:
- Switch on the radio and wait at least 30 seconds.
- Press the MENU button once and then button "5" twice. This establishes a connection with a voice recognition system.
- When requested, give the telephone number, e.g. +49 174/19912345, and then dial. This can be done in one or more blocks, e.g. beep 174.
- The customer is now informed that activation has been completed successfully and the card has been activated with a credit sum of Euros 12.78 (DM 25). Depending on use, this lasts between five minutes and one hour.

Note: The station button "2" establishes an immediate direct connection to an emergency operator (identical to the "EMERGENCY CALL 112") and should only be pressed in a genuine emergency. Do not use button 2 for test or demonstration purposes.

Diagnostic trouble codes

- As a rule, the user only receives a general indication of a problem (fault). Specific fault messages are reserved for service personnel.
- Even in normal use, only a few faults which affect the GSM and GPS systems are indicated as specified faults (refer to the list of diagnostic trouble codes).
- Diagnostic trouble codes (DTCs) are stored in the Telematics module and can be read out with the aid of WDS.

Fault categorisation

- Faults are arranged in four categories according to their effects:

Fault category 1

- When the system is switched on, the user is informed at once or directly after switching on by a fault message. Corresponding diagnostic trouble codes are stored in a non-volatile memory.

Fault category 2

- The user is informed at once or directly after switching on the system by a fault message. There is no need for diagnostic trouble codes to be stored.

Fault category 3

- The user is informed by a fault message when calling or in the telephone mode. Corresponding diagnostic trouble codes are stored in a non-volatile memory.

Fault category 4

- The user is informed by a fault message when calling or in telephone mode. There is no need for diagnostic trouble codes to be stored.

Note: Further information is to be found in the operating instructions CG 3388 + CG 3414, in the Telematics manual, in emergency bulletins 0691–0694 and in TSB 029/2001.

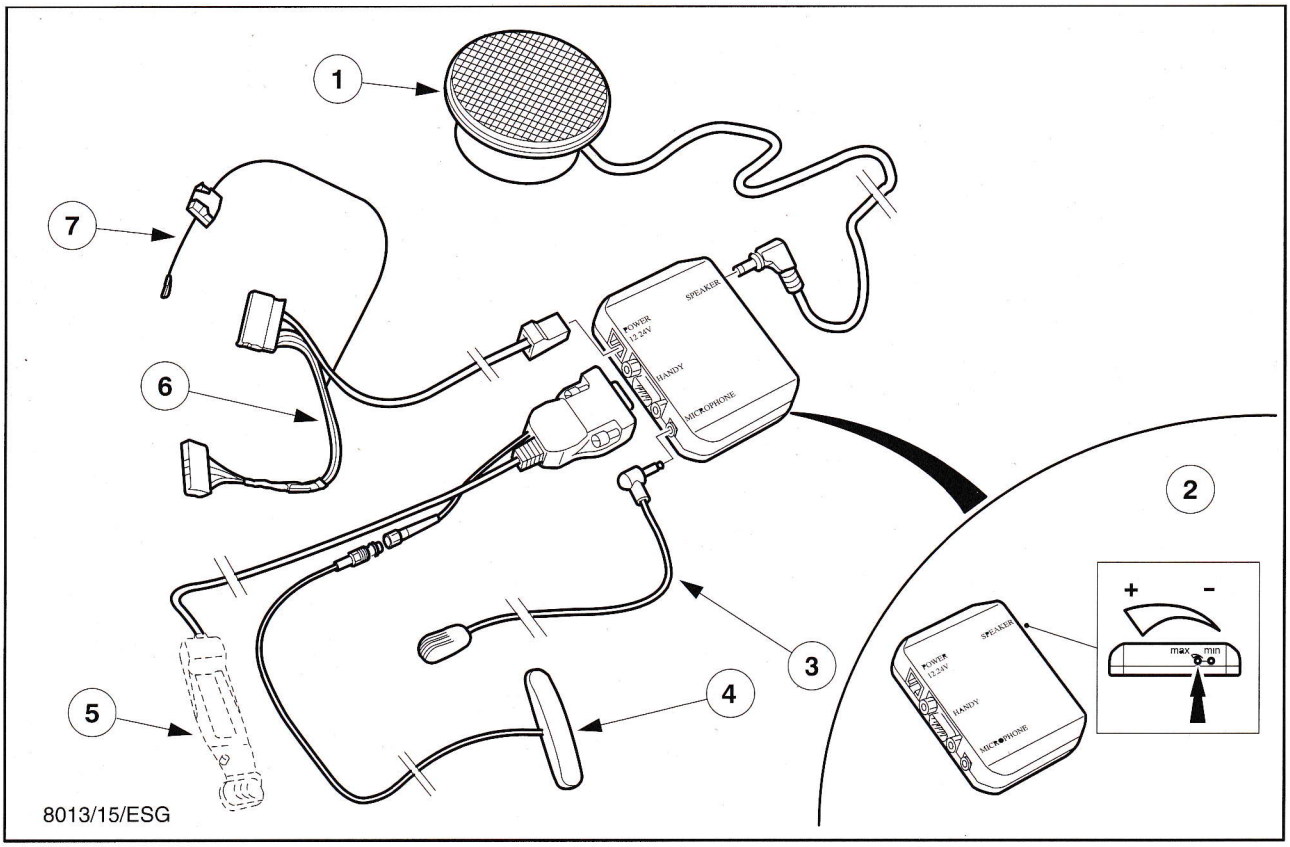
List of diagnostic trouble codes

Fault message	System	Fault description	DTC	General/ specific indication	Fault category
SYS OK	Complete system	No fault recognized		General	
GSM BUS	GSM databus	Fault in databus		General	1
GPS RXHW	GPS receiver (Telematics module)	GPS receiver faulty		General	3
FLASH CS	Telematics module	Electronic processor faulty		General	1
EE FAULT	Telematics module	Electronic processor faulty		General	4
EE ERASE	Telematics module	Electronic processor faulty		General	3
SPEEDSIG	VSS	No VSS signal		General	3
AIRBAG	Air bag wiring	Air bag wiring faulty	A628	General	1
ACP BUS	ACP databus	Fault in databus		General	1
GPS	GPS antenna	Break in antenna	A205	Specified	3
NO SVC	GSM antenna	No network connection	A642	Specified	4
NO PHONE	GSM	Telephone switched off		Specified	2
NO SIM	GSM	No or faulty SIM card	A678	Specified	2
SIM ERR	SIM card	Invalid SIM card		Specified	4

Limited operation

- The system is designed so that it can still perform as many functions as possible even when faults occur.
- Depending on the fault which occurs, it may be necessary to manage without sending the position data for example whereas telephone services can still be used.
- However, if the GSM system fails, none of the Telematics functions can be performed any more.
- Fault messages are transmitted according to the operational readiness of the system.

Telephone



1 Loudspeaker
2 Control unit with volume control
3 Microphone
4 Window antenna
5 Telephone-specific installation kit
6 Wiring loom
7 Connecting cable for radio muting

Operations during initial commissioning/predelivery inspection

- Installation of the specific holder for the customer's mobile phone.
- If necessary, checking/adjustment of the microphone volume.

ABS	**A**nti-lock **B**raking **S**ystem
AST	**A**uto**st**ore
CD	**C**ompact **D**isc
EON	**E**nhanced **O**ther **N**etworks
GPS	**G**lobal **P**ositioning **S**ystem
LED	**L**ight **E**mitting **D**iode
LHD	**L**eft-**H**and **D**rive
NAV	**Nav**igation
PDI	**P**re-**D**elivery **I**nspection
RDS	**R**adio **D**ata **S**ystem
RHD	**R**ight-**H**and **D**rive
RNS	**R**adio **N**avigation **S**ystem
ROM	**R**ead **O**nly **M**emory
TA	**T**raffic **A**nnouncement
TP	**T**raffic **P**rogram