



Mercedes-Benz

Distronic Cruise Control for Model 211



DTR: Distance Tracking Radar

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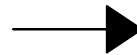
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Important Points:

- DTR is a further development of cruise control
- DTR is a convenience system... not a safety system
- DTR will reduce speed when necessary in order to maintain a selected following interval
- DTR information is displayed in cluster
- Additional components necessary for DTR operation
- Checks, adjustments and adaptations necessary for DTR
- DTR works closely with ESP, ME-SFI and ETC
- Answers to common DTR complaints



DTR is Cruise Control and More...

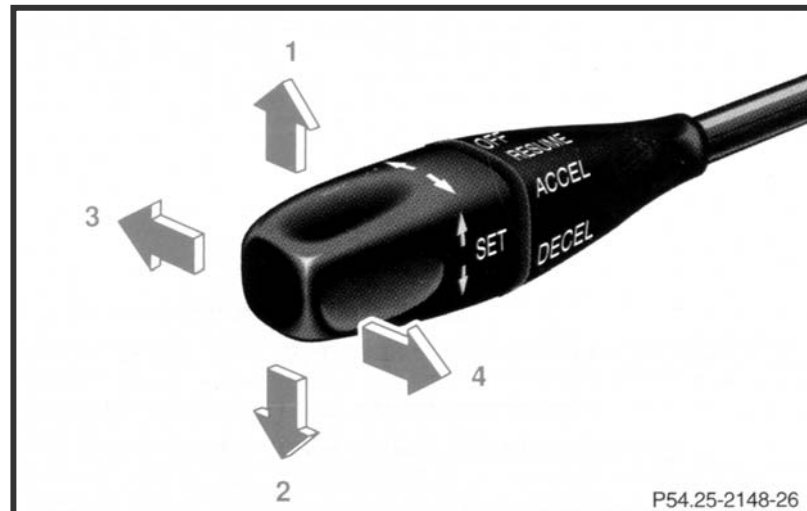
- With no vehicle ahead, DTR will operate like normal cruise control
 - Downshifting to slow the vehicle when going downhill
 - Slowing the vehicle when set speed is toggled lower with switch
- With a vehicle ahead, DTR will control the “following interval”
 - Driver selects desired “following interval”
 - DTR will reduce the speed difference to match the lead vehicle
 - DTR will warn driver audibly, and in the instrument cluster display if closing speed to lead vehicle is too high

How DTR Lowers Vehicle Speed

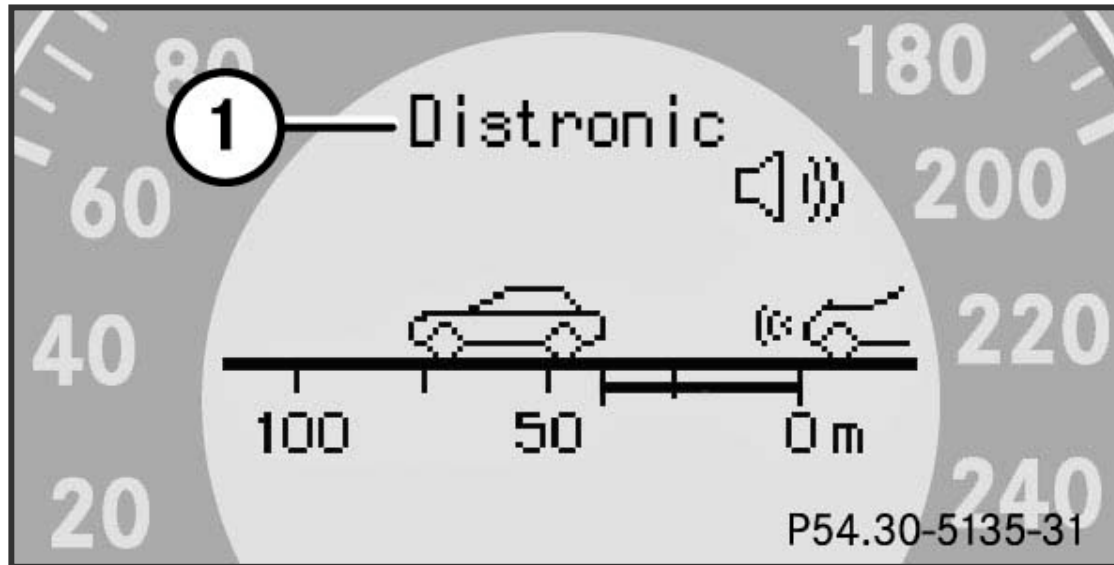
- Reduces engine torque
 - DTR > ESP > ME-SFI
- Downshifts when going downhill
 - DTR > ESP > ETC
 - No lower than 3rd gear
- Applies brakes
 - when going downhill
 - DTR > ESP > SBC
 - 10% or less braking is normally sufficient
 - 20% maximum braking is possible

Switching DTR On and Adjusting Speed

- DTR is switched on when switching on cruise control (S40)
- Tapping upwards (1) or downwards (2) changes the “SET” speed to the next ~ 5 mph increment. (ie: starting at a set speed of 62mph, you would change to either 65 or 60mph)
- Tapping the switch in the “RESUME” direction (4) increases the set speed in 1 mph increments.



Display When Switching On DTR



- The word *Distronic* (1) will be displayed
- Audible warning symbol appears when function is enabled
- The selected speed will be displayed for ~ 5 seconds

Notes on Switching DTR On and Off

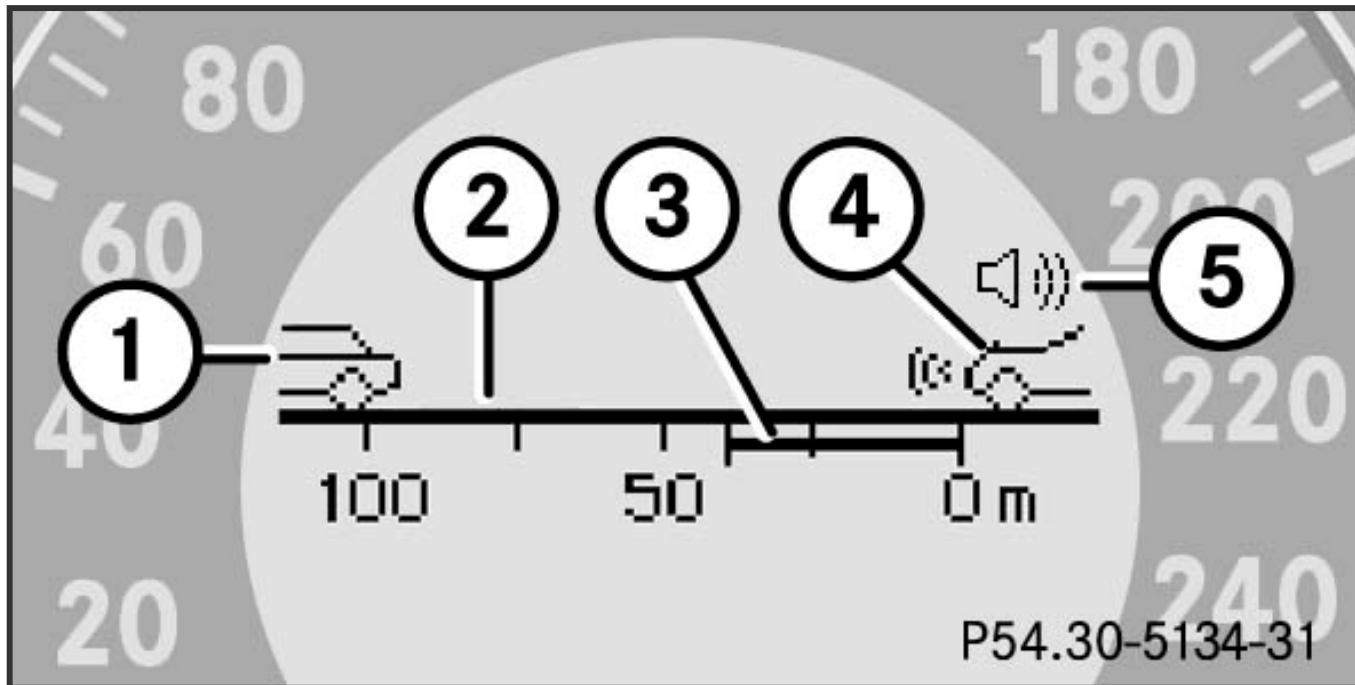
- DTR will not engage:
 - For up to 2 minutes after engine start-up
 - This is the initialization / self-test phase
 - <25mph
 - If parking brake is activated
 - If ESP has been switched off manually
 - If gear selector is not in position “D”
- DTR will switch OFF for the same reasons cruise control switches off

DTR Controls on Center Console



- 1) Audible warning on-off switch (S46/8s1)
- 2) Indicator light
 - Light ON means audible warning ON
- 3) Potentiometer for regulating following interval from 1-2 seconds (S46/8r1)

Additional Information From Display



- 1) Lead vehicle
- 2) Distance to lead vehicle
- 3) Minimum following distance
calculated from selected following
interval (1-2 seconds)
- 4) Vehicle driven
- 5) Audible warning ON

Operating Notes

- Note: DTR screen can be displayed in cluster while driving *without* engaging cruise control (the word *Distronic* doesn't appear)
- Audible DTR warnings are active without cruise control engagement, unless switched off by driver
- DTR will *not* apply the brakes to slow the vehicle while driver is using accelerator to exceed the DTR speed setting
- System is designed to work with moving objects

Display when Overtaking Another Vehicle



Information and warnings displayed as a result of CAN C data received from DTR control module:

- “DISTRONIC” = DISTRONIC is engaged
- Desired speed set at 130km/h (1)
- Vehicle speed has been reduced to 80km/h to match speed of lead vehicle
- Minimum following interval set by driver to approximately 35 meters

What DTR “Sees”:

The screenshot displays the 'ZielAusWahlSIMulation' software interface. The main window shows a simulation of a vehicle's field of view (FOV) on the left and a live video feed of the road ahead on the right. The FOV is represented by a dark area with a white car icon at the bottom center and a vertical axis on the right ranging from 0 to 150. The video feed shows a road with a white dashed line and a guardrail on the left. A toolbar on the right contains various icons for navigation and control.

Below the video feed, there are two data panels:

Relevantes Objekt

	LR_Dat1:	LR_Dat2:	Datei:	
Vrel:	+0.0	+0.0	+0.0	km/h
Abst:	0.0	0.0	0.0	m
Winkel:	+0.0	+0.0	+0.0	Grad
Steh:	0	0	0	
Guelutig:	0	0	0	
Si:	0.00	0.00	0.00	
Nr:	-1	-1		
ZVG:	0		0	

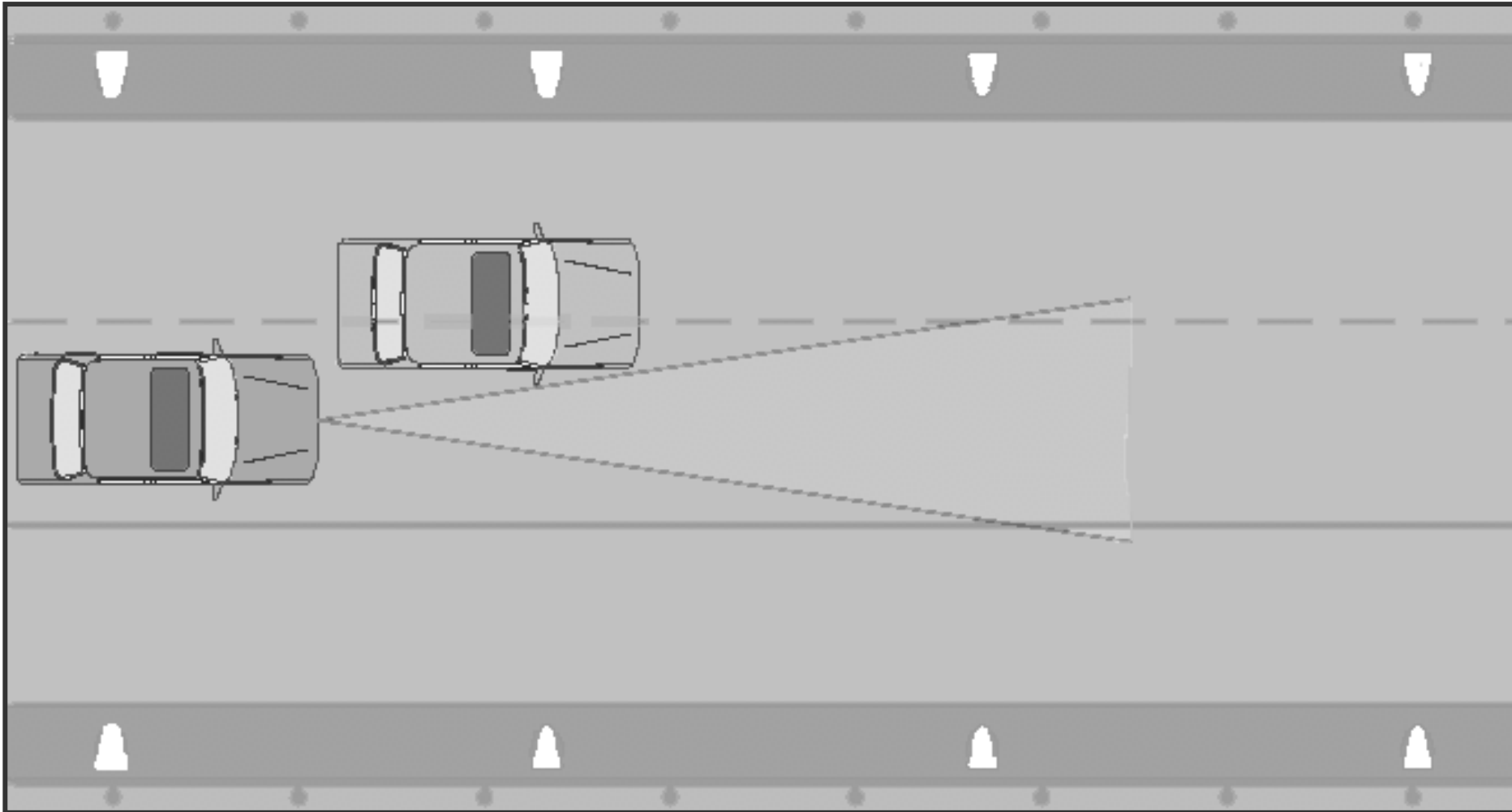
Globale Fahrzeugdaten

Veigen-FZG:	108.0	Veigen:	36.4	
Stillstand:	0	IstGang:	4	IstBremsMo: 0
LV-FZG:	+3.9	LV:	+1.2	
Offset_feinnorm:	+4.00	Zustand:	0	
Drehrate-FZG:	+0.78	Drehrate:	+0.79	
Offset still:	+0.780	AbgleichOK:	1	AbgleichTempOK: 0
Offset dynam:	+0.000	AbgleichOK:	0	AbgleichTempOK: 0

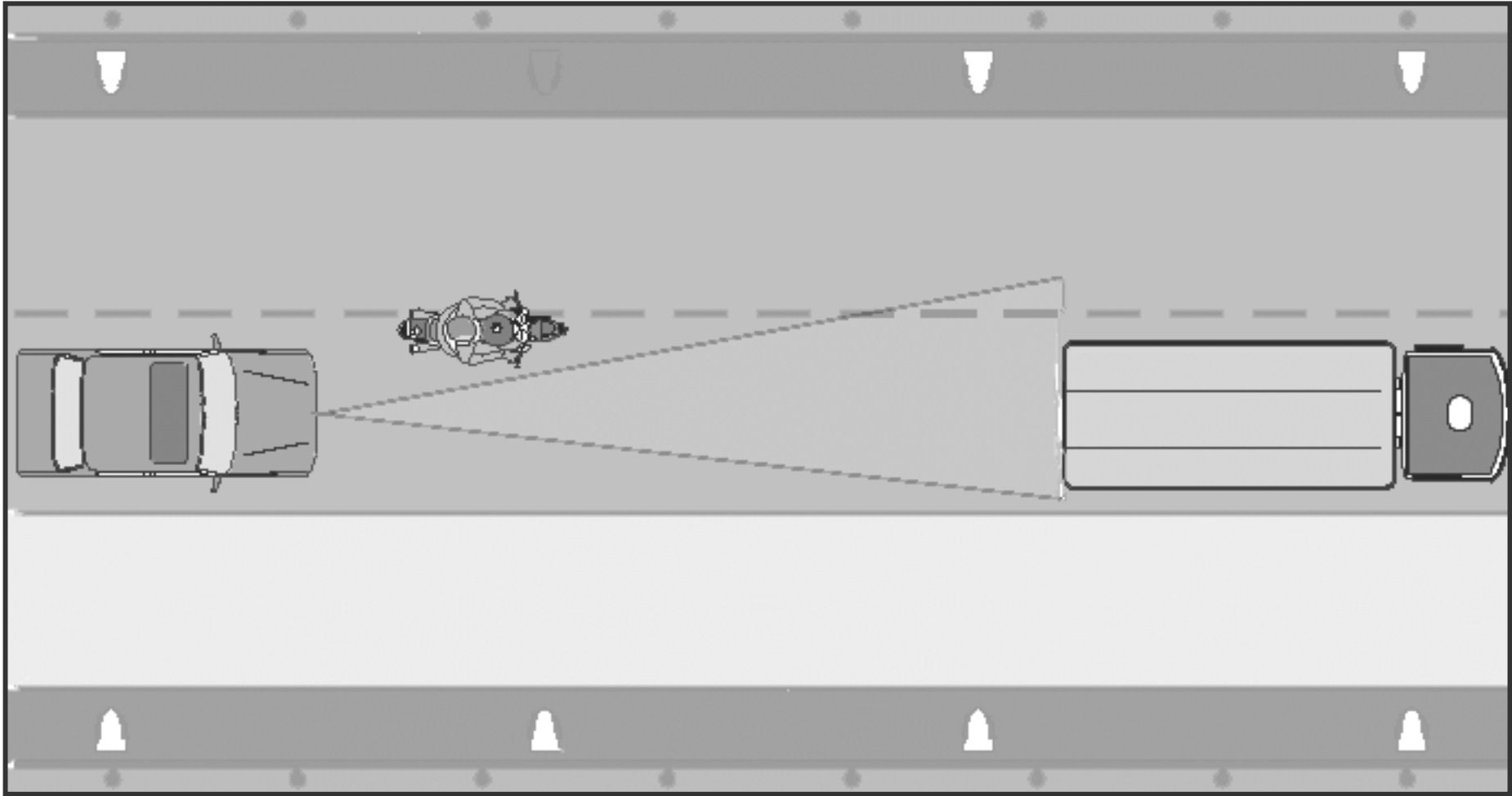
Thomas Berndt
Michael Kircher
Wolfgang Kull
Wolfgang Lauer
Thomas Reichmann

Drücken Sie Strg+F1, um Hilfe zu erhalten. Z:1 V2.04

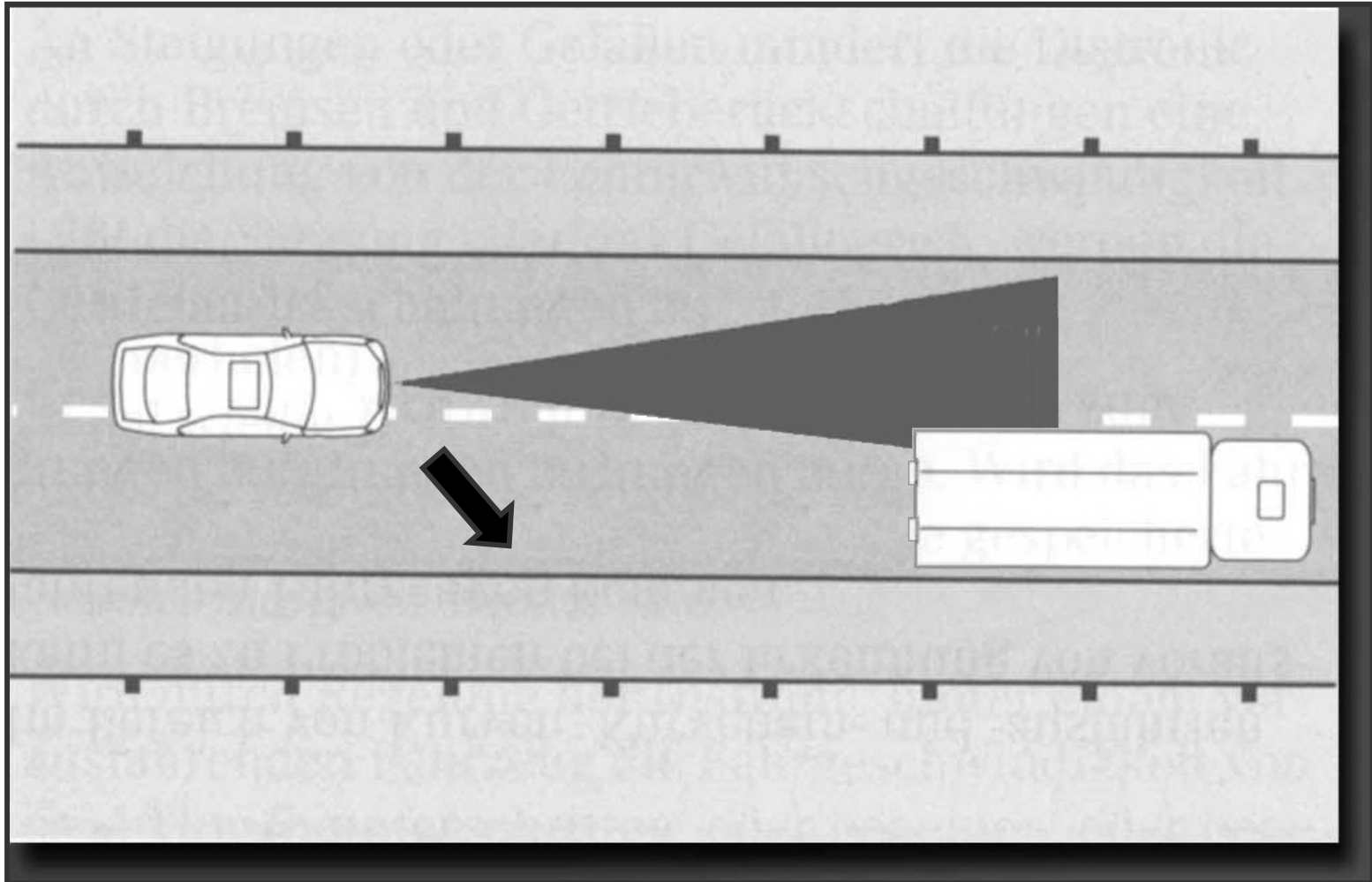
Detection Challenge:



Detection Challenge:

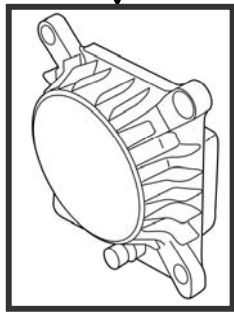
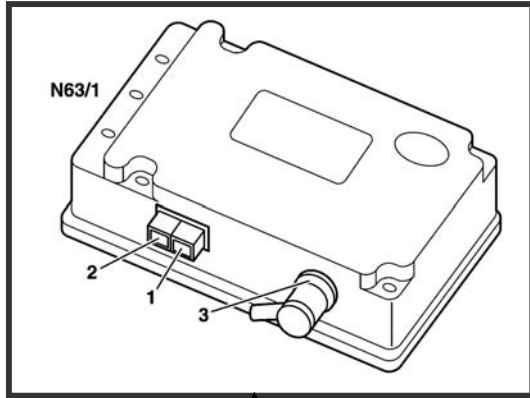


Detection Challenge:



DTR Network

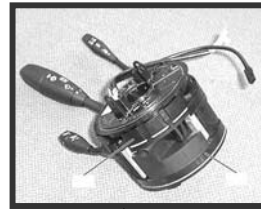
DTR module
(N63/1)



Radar sensor
(B29)



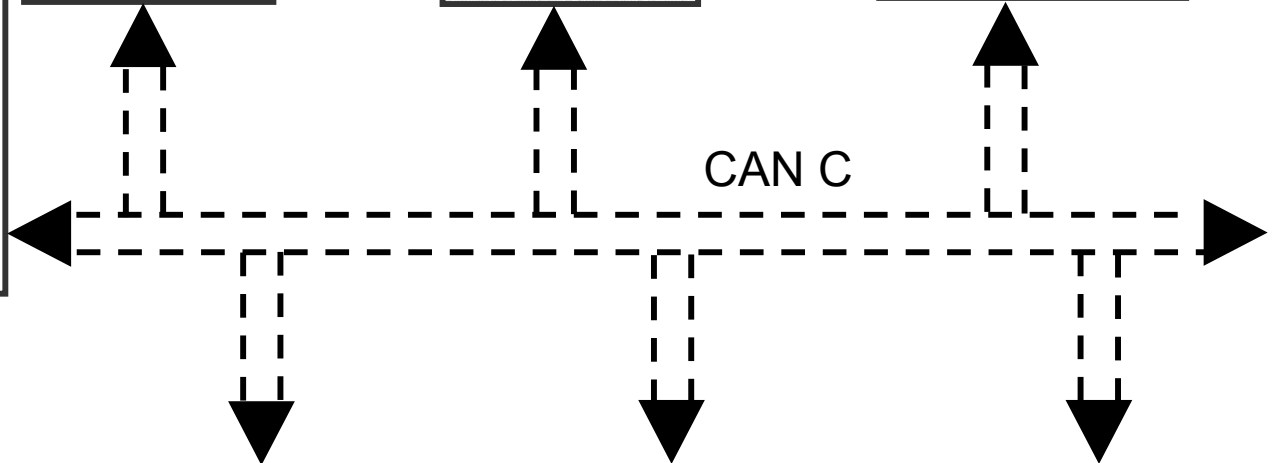
ICM
(A1)



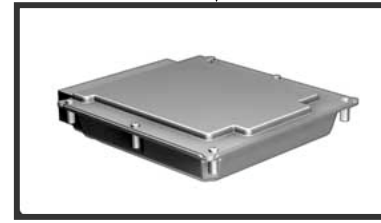
SCM
(N80)



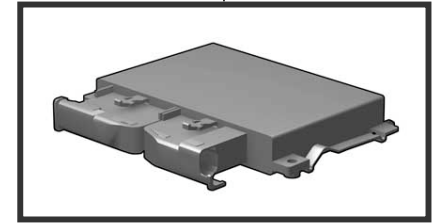
CGW
(N93)



ESP
(N47-5)

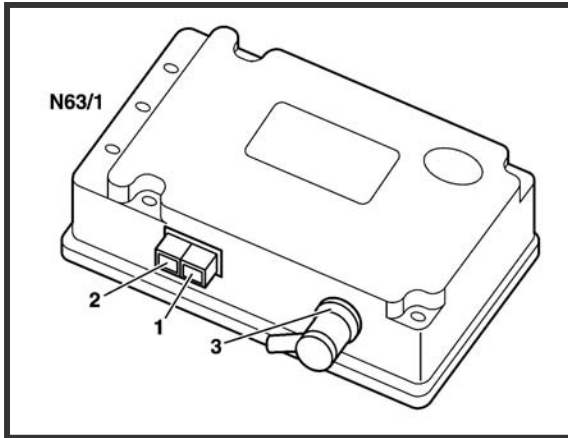


ME-SFI
(N3/10)



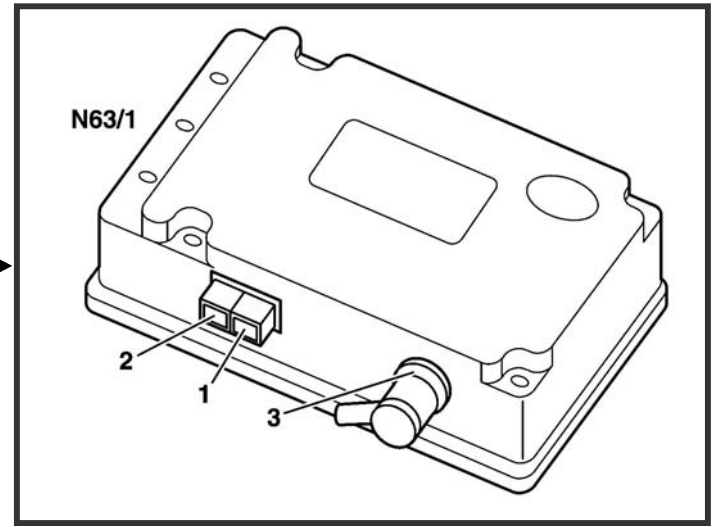
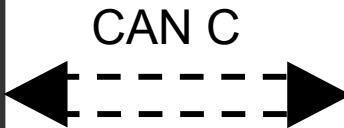
ETC
(N15/3)

DTR Control Module (N63/1)



- Task
 - Provide power for radar sensor
 - Detect vehicles ahead
 - Determine need for and request necessary intervention
 - Control ICM displays and warning signal
- Design
 - 3 connectors, 1 is coaxial from B29
- Function
 - Interpret radar sensor data
 - Assess pertinent CAN C data
- Location
 - Front passenger floor

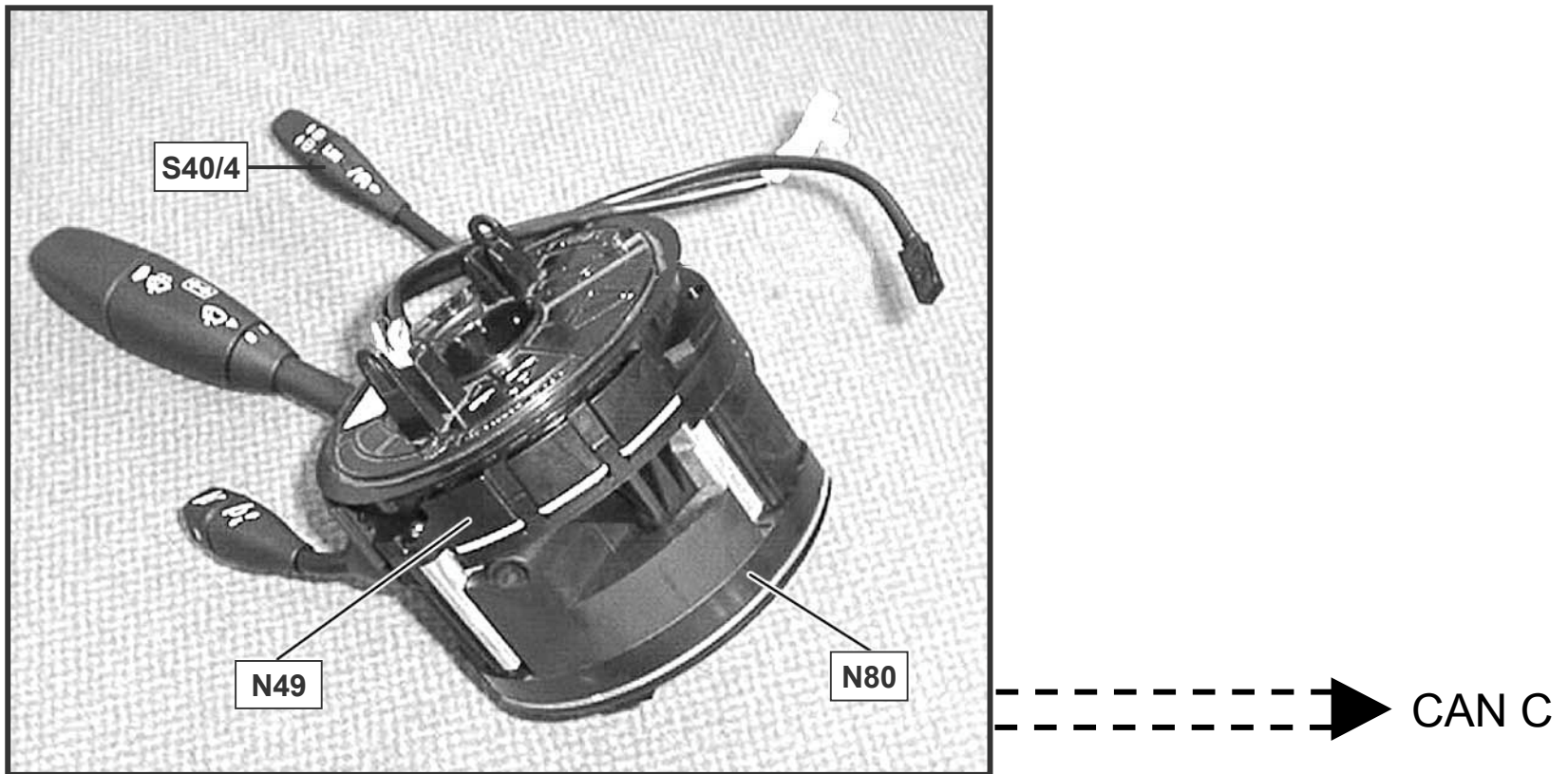
Instrument Cluster Module (A1)



- Displays information and warnings sent by DTR module
- Audible warning actuated
- Visual warning actuated



Steering Column Module (N80)



Input from Steering angle sensor (N49) and cruise control switch (S40/4) is received by Steering Column Module (N80). Data is then sent to CAN C

Central Gateway (N93)



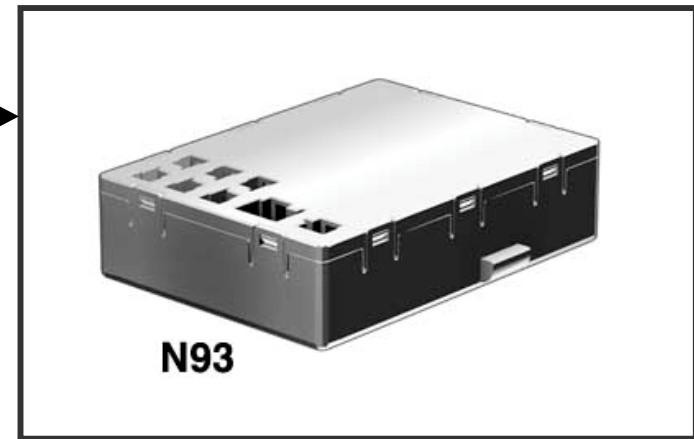
Upper Control Panel
(N72/1)



Console switches
(S46/8)

- Audible warning switch
- Following interval potentiometer

CAN B

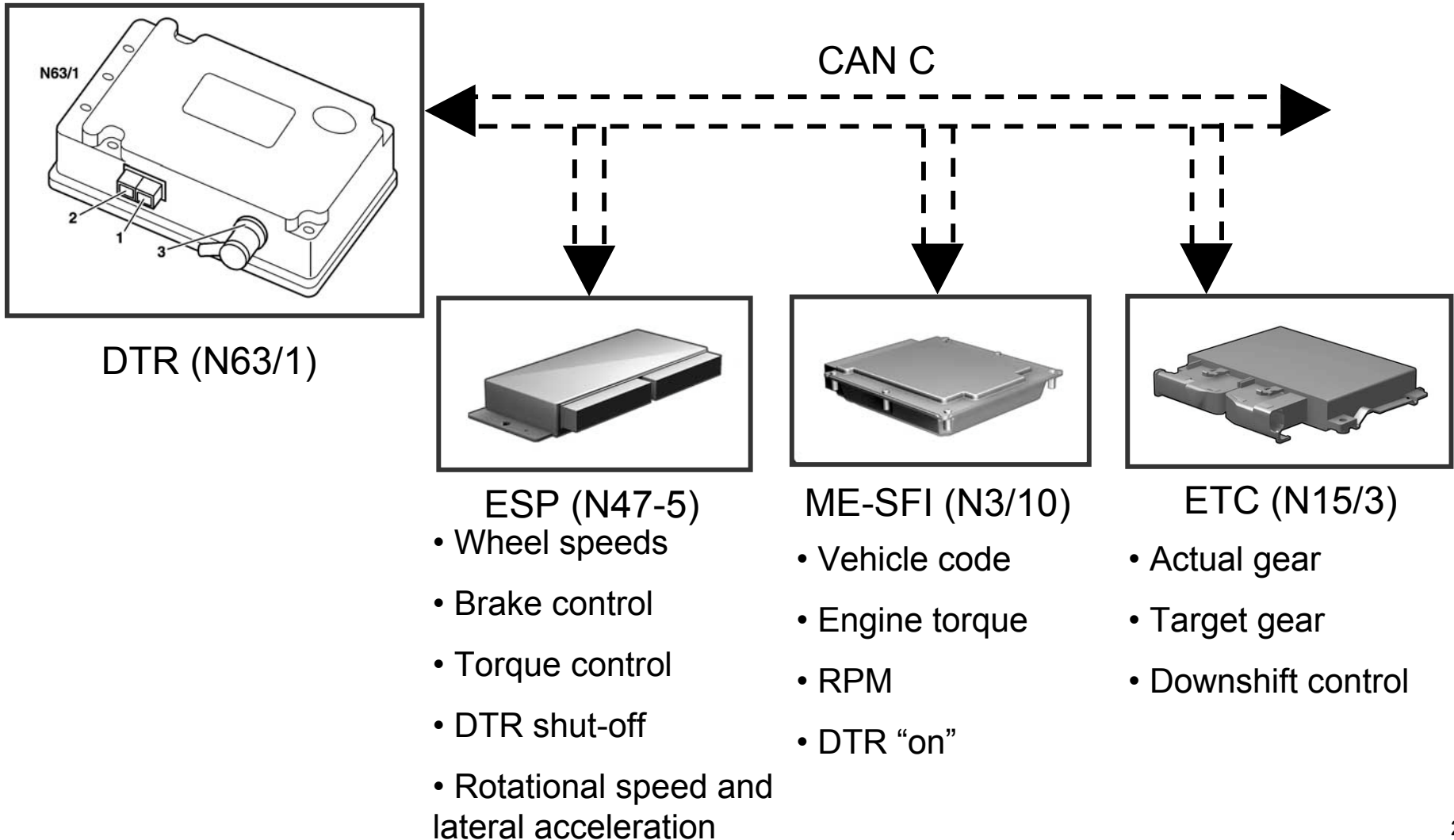


N93

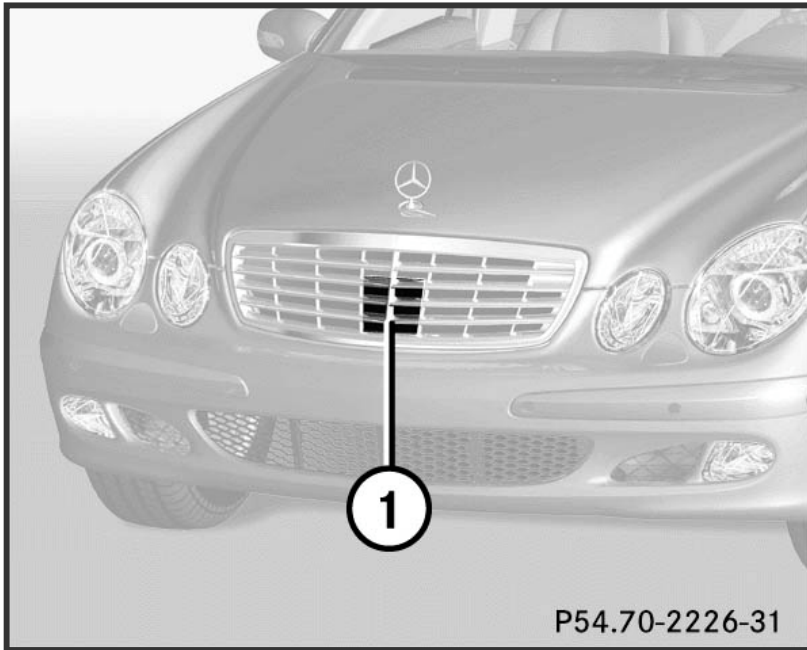
National
code
information

CAN C

ESP, ME-SFI and ETC



DTR Radar Sensor (B29)



Task: Transmit radar signals forward and receive the reflected signals. Transmit processed analog data over coaxial cable directly to DTR control module.



Data used by DTR to detect objects:

- Distance to object
- Speed of object
- Angle to object
- Radar segment used
- Intensity of reflected beam

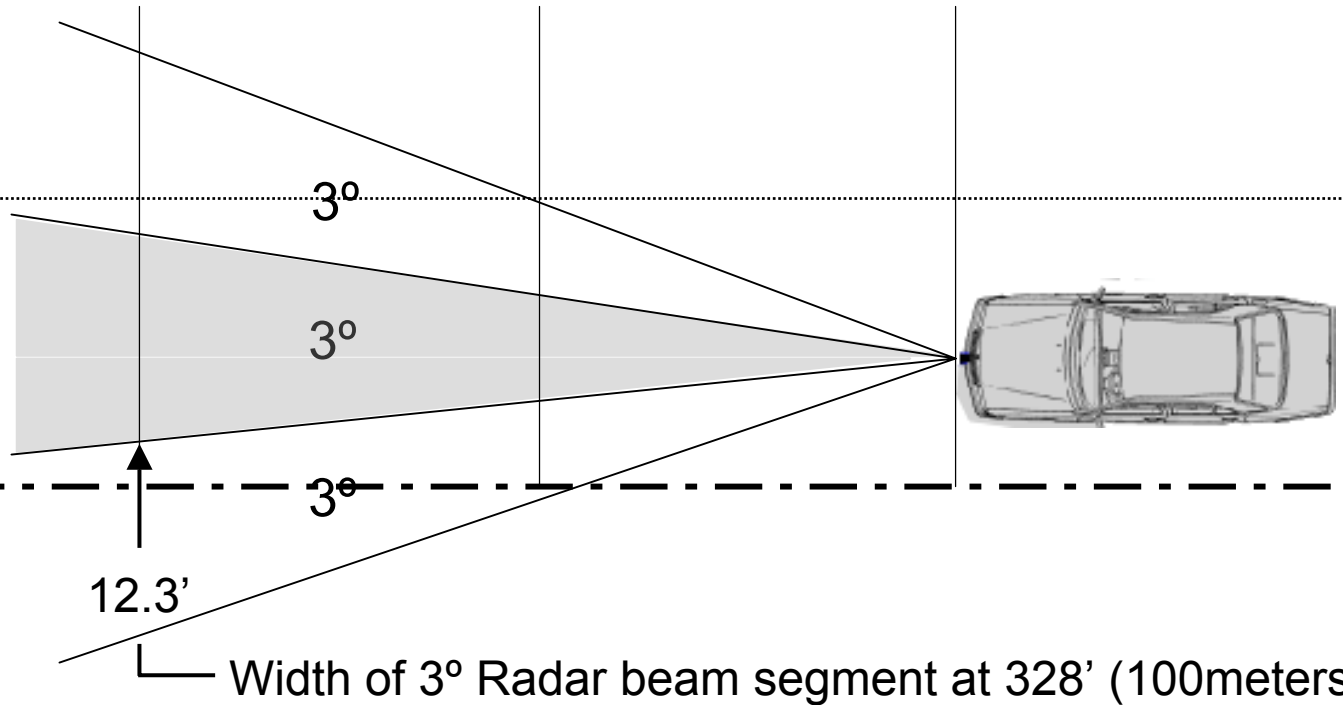
3 Radar Sensor Beam Segments

Feet

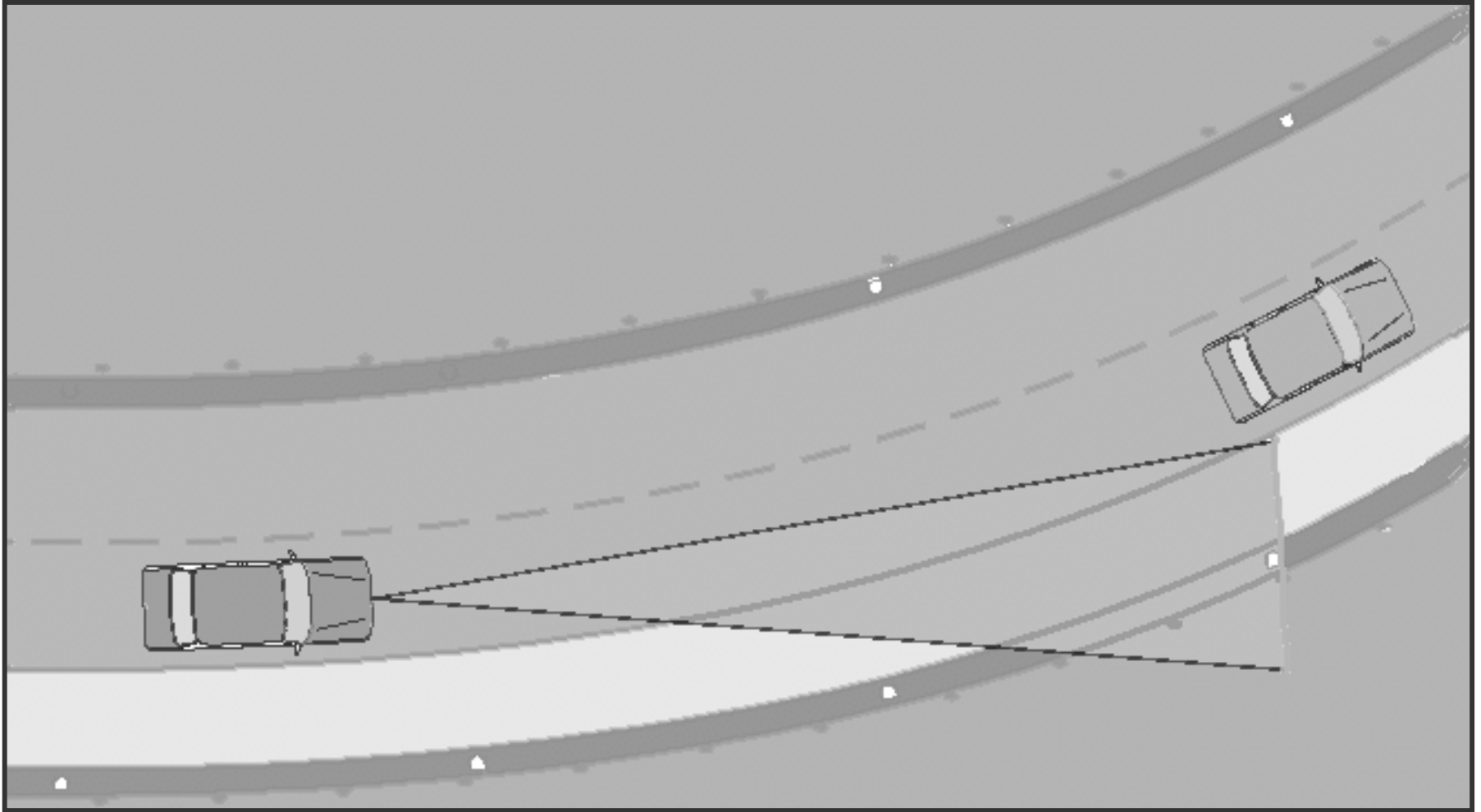
328'

164'

0



Detection Challenge:



Radar Sensor Adjustment to be Performed ONLY by Technicians Completing TECH234 Alignment Course

- Checking aim of radar sensor (B29) is necessary when:
 - Radar sensor (B29) has been replaced
 - Any repairs have been made to front end of vehicle that affect position of radar sensor (B29)
 - Wheel alignment has been adjusted
 - Results of DAS “Object Recognition Check” indicate that it should be done

DTR Control Unit Adaptation

- Adaptation is necessary after:
 - Replacement of DTR control module (N63/1)
 - Replacement of steering angle sensor (N49)
 - Removal of steering wheel
 - Replacement or adjustment of radar sensor (B29)
 - Exchange or repair of chassis components including setting wheel toe
- What is being “adapted”:
DTR control module with steering angle sensor, radar sensor, lateral/yaw sensor, and wheel speed inputs
- How to do it:
 - Connect DAS to vehicle>select DTR>select Control unit adaptations>answer YES

Service Tip

- Before working on DTR...Check for and correct faults in *all* drive and chassis systems
- Remember...DTR works together with
 - Electronic Stability Program (N47-5)
 - Steering Column Module (N80)
 - ME-SFI (N3/10)
 - Electronic Transmission Control (N15/3)
 - Electronic Ignition Switch (N73)
 - Instrument Cluster (A1)
 - Vehicle level control system

ICM Message Meaning

Distronic Malfunction
Clean Sensor



- DTR is automatically switched off
- Message can be cleared after cleaning by switching ignition off/on
- No fault codes are stored(see exception below)

Possible
causes :

- Dirt, snow or ice build up on the radar sensor. (The display shows“ ---“, instead of the current vehicle speed.)
- Heavy rain, mist or fog which can dampen radar signals enough to cause difficulty in detecting vehicles ahead.
- Road spray may cause warning chime and temporary shutdown of DTR (*Extended exposure will cause a DTC*)

Distronic (DTR)

Group:	30.30
Control unit designation:	N63/1
U.S. Introduction:	MY2001
Major components:	DTR Control Module (N63/1) Radar Sensor (B29) Steering Angle Sensor (N49) Cruise Control Switch (S40/4) Console Switches (S46/8) Electronic Ignition Switch (N73) Instrument Cluster (A1) Electronic Stability Program (N47-5) ME-SFI (N3/10) Electronic Transmission Control (N15/3) Upper Control Panel (N72/1) Steering Column Module (N80)
CAN(s) used:	CAN B & CAN C
Mils:	No
Warning messages in Cluster?	Yes
DTC capable?	Yes
Control unit adaptation?	Yes
Requires control unit adaptation in:	EIS, ME-SFI, ICM, CGW

Acronyms used in this Presentation

CAN	Controller Area Network
CGW	Central Gateway
DAS	Diagnostic Assistance System
DTR	Distance Tracking Radar
ESP	Electronic Stability Program
ETC	Electronic Transmission Control
ICM	Instrument Cluster module
ME-SFI	Motor Electronics-Sequential Fuel Injection
SBC	Sensotronic Brake Control
SCM	Steering Column Module
UCP	Upper Control Panel

Appendix

- W211 self-study material
- MBUSA Technical Training website:
<http://www.mbusatechtraining.com/home.asp> > Information Access
- Job numbers below concern R230 (W211-specific info unavailable at this time)
- GF30.30-P-0999Z DISTRONIC (DTR) function description contents
- AR30.30-P-1000R Inspect/adjust setting of sensors of DISTRONIC (DTR)