

10.5 Models 170, 202 (with engine 111) as of Model Year 2000

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Diagnosis – Function Test

WARNING!

Life threatening injuries possible if following protective measures are not followed.

CAUTION!

Risk of severe injury, due to uneven placement of lift arms/lift arm supports, as well as the support and lifting of vehicle components, there is the possibility of the vehicle slipping while on the lift.

CAUTION!

Danger of vehicle toppling off of lift due to irregular weight distribution after the removal of components and axles.

Protective measures:

- Center vehicle (fore, aft and across) properly on both sides of the lift columns.
- When supporting components while the vehicle is on a lift, ensure that the vehicle is not lifted from the lift arms, therefore secure vehicle to the lift arms as well.
- Ensure that the lift arm supports are even and parallel to each other when lifting the vehicle.

Protective measures continued:

- Prior to lift vehicle completely (wheels still in contact with floor), ensure that the lift arm supports are correctly placed onto the vehicle contact points.
- Prior to removing the axles or components from the vehicle while on the lift, secure the vehicle to the lift arms or place sand bags inside the vehicle to ensure proper weight distribution to prevent toppling of the vehicle from the lift.
- Basically obey all the rules/guide lines regarding the lifting of vehicles as stated in the operator's manual by the lift manufacturer.



Control Module Adaption:

After the swap of the ESP/SPS/BAS or ESP/BAS control module (N47-5), it is important to perform the adaption procedure, since the control module must learn the values for the BAS solenoid valves. See HHT menu.

Preparation for Test:

Review 11, 13, 20, 21, 23

Diagnosis – Function Test – ABS Lateral Acceleration Sensor (B43)

	Procedure	Hints
	<p>i This function test applies as of M.Y. 2000 only</p> <p>The following description of the driving test is to be performed only upon the replacement or swap of the ABS Lateral Acceleration sensor (B43) and/or the Rotating Speed Sensor for ESP (B45).</p>	<p>Via this driving test, the following faults can be isolated:</p> <ul style="list-style-type: none"> • improperly connected connectors of the sensors., • twisted wires of the respective sensors • sensors with implausible signals
1	<p>Activate Test: Release driving test via Star Diagnosis</p>	<p>i</p> <p>Engine is running (idle). The release of the driving test remains active even after the ignition is switched OFF or ON. The driving test is ended when the driving test procedure is completed or it is deactivated via Star Diagnosis.</p> <p>BAS/ESP MIL (A1e47) and ABS MIL (A1e17) are illuminated: Indicating to the driver: ABS: ON ESP: OFF</p> <p>Thus after the release, the ESP system is OFF, however the functions of the BAS, ABS, and ASR systems remain active.</p> <p>i</p> <p>Within the DTC fault memory the following is entered: "Driving Test Active". This DTC will be erased automatically upon completion of the Driving Test.</p>

Diagnosis – Function Test – ABS Lateral Acceleration Sensor (B43) (continued)

	Procedure	Hints
	<p>i</p> <p>The following description of the driving test is to be performed only upon the replacement or swap of the ABS Lateral Acceleration sensor (B43) and/or the Rotating Speed Sensor for ESP (B45).</p>	<p>Via this driving test, the following faults can be isolated:</p> <ul style="list-style-type: none"> • improperly connected connectors of the sensors., • twisted wires of the respective sensors • sensors with implausible signals
2	<p>Stationary deviation of the ABS Lateral Acceleration Sensor (B43) and/or Rotating Speed Sensor of ESP (B45): Press ESP switch in direction: ON Vehicle is stationary and the steering wheel is pointed straight ahead.</p>	<p>i</p> <p>By pressing the ESP switch, a time window of 20 seconds is started, which can lengthened in time span as desired. BAS/ESP MIL (A1e47) begins to blink as an indication that the stationary deviation test of the ABS Lateral Acceleration Sensor has started. Upon correct procedure the BAS/ESP MIL (A1e47) will illuminate. This then is the signal to perform the driving test as described in point 3 of the menu. Should the vehicle be moved in any way during the stationary deviation test, the stationary deviation test of the ABS Lateral Acceleration Sensor will not be performed. The BAS/ESP MIL (A1e47) will be illuminated.</p> <p>In case of fault: Read out the DTC fault code memory.</p>

Diagnosis – Function Test – ABS Lateral Acceleration Sensor (B43) (continued)

	Procedure	Hints
3	<p>Dynamic testing of the ABS Lateral Acceleration Sensor (B43) and/or Rotating Speed Sensor of ESP (B45): Drive the vehicle in a forward direction at a speed between 5 to 25 km/h (3 to 15 mph). After approx. 20 feet, driving at a constant speed, turn the steering wheel either left or right, but not more than 360°.</p>	<p>i</p> <p>The ESP/BAS control module (N47-5) performs an evaluation of the rotating signals and lateral acceleration signals. After a successful completion, the BAS/ESP MIL (A1e47) and ABS MIL (A1e17) will go out.</p> <p>In case of fault: ABS MIL (A1e17) is illuminated: Driving test not successful. Repeat the dynamic driving test (menu item 3).</p> <p>BAS/ESP MIL (A1e47) is illuminated: Driving test not successful. Readout DTC memory.</p>

Diagnosis – Function Test – Rotating Speed Sensor for ESP (B45)

	Procedure	Hints
	<p>i This function test applies as of M. Y. 2000 only</p> <p>The following description of the driving test is to be performed only upon the replacement or swap of the ABS Lateral Acceleration sensor (B43) and/or the Rotating Speed Sensor for ESP (B45).</p>	<p>Via this driving test, the following faults can be isolated:</p> <ul style="list-style-type: none"> • improperly connected connectors of the sensors., • twisted wires of the respective sensors • sensors with implausible signals
1	<p>Activate Test: Release driving test via Star Diagnosis</p>	<p>i</p> <p>Engine is running (idle). The release of the driving test remains active even after the ignition is switched OFF or ON. The driving test is ended when the driving test procedure is completed or it is deactivated via Star Diagnosis.</p> <p>BAS/ESP MIL (A1e47) and ABS MIL (A1e17) are illuminated: Indicating to the driver: ABS: ON ESP: OFF</p> <p>Thus after the release, the ESP system is OFF, however the functions of the BAS, ABS, and ASR systems remain active.</p> <p>i</p> <p>Within the DTC fault memory the following is entered: "Driving Test Active". This DTC will be erased automatically upon completion of the Driving Test.</p>

Diagnosis – Function Test – Rotating Speed Sensor for ESP (B45) (continued)

	Procedure	Hints
	<p>i</p> <p>The following description of the driving test is to be performed only upon the replacement or swap of the ABS Lateral Acceleration sensor (B43) and/or the Rotating Speed Sensor for ESP (B45).</p>	<p>Via this driving test, the following faults can be isolated:</p> <ul style="list-style-type: none"> • improperly connected connectors of the sensors., • twisted wires of the respective sensors • sensors with implausible signals
2	<p>Stationary deviation of the ABS Lateral Acceleration Sensor (B43) and/or Rotating Speed Sensor of ESP (B45): Press ESP switch in direction: ON Vehicle is stationary and the steering wheel is pointed straight ahead.</p>	<p>i</p> <p>By pressing the ESP switch, a time window of 20 seconds is started, which can lengthed in time span as desired. BAS/ESP MIL (A1e47) begins to blink as an indication that the stationary deviation test of the ABS Lateral Acceleration Sensor has started. Upon correct procedure the BAS/ESP MIL (A1e47) will illuminate. This then is the signal to perform the driving test as described in point 3 of the menu. Should the vehicle be moved in any way during the stationary deviation test, the stationary deviation test of the ABS Lateral Acceleration Sensor will not be performed. The BAS/ESP MIL (A1e47) will be illuminated.</p> <p>In case of fault: Read out the DTC fault code memory.</p>

Diagnosis – Function Test – Rotating Speed Sensor for ESP (B45) (continued)

	Procedure	Hints
3	<p>Dynamic testing of the ABS Lateral Acceleration Sensor (B43) and/or Rotating Speed Sensor of ESP (B45): Drive the vehicle in a forward direction at a speed between 5 to 25 km/h (3 to 15 mph). After approx. 20 feet, driving at a constant speed, turn the steering wheel either left or right, but not more than 360°.</p>	<p>i</p> <p>The ESP/BAS control module (N47-5) performs an evaluation of the rotating signals and lateral acceleration signals. After a successful completion, the BAS/ESP MIL (A1e47) and ABS MIL (A1e17) will go out.</p> <p>In case of fault: ABS MIL (A1e17) is illuminated: Driving test not successful. Repeat the dynamic driving test (menu item 3).</p> <p>BAS/ESP MIL (A1e47) is illuminated: Driving test not successful. Readout DTC memory.</p>

Diagnosis - Diagnostic Trouble Code (DTC) Memory

WARNING!

Life threatening injuries possible if following protective measures are not followed.

CAUTION!

Risk of severe injury, due to uneven placement of lift arms/lift arm supports, as well as the support and lifting of vehicle components, there is the possibility of the vehicle slipping while on the lift.

CAUTION!

Danger of vehicle toppling off of lift due to irregular weight distribution after the removal of components and axles.

Protective measures:

- Center vehicle (fore, aft and across) properly on both sides of the lift columns.
- When supporting components while the vehicle is on a lift, ensure that the vehicle is not lifted from the lift arms, therefore secure vehicle to the lift arms as well.
- Ensure that the lift arm supports are even and parallel to each other when lifting the vehicle.

Protective measures continued:

- Prior to lift vehicle completely (wheels still in contact with floor), ensure that the lift arm supports are correctly placed onto the vehicle contact points.
- Prior to removing the axles or components from the vehicle while on the lift, secure the vehicle to the lift arms or place sand bags inside the vehicle to ensure proper weight distribution to prevent toppling of the vehicle from the lift.
- Basically obey all the rules/guide lines regarding the lifting of vehicles as stated in the operator's manual by the lift manufacturer.

Preparation for Test:

1. Review section 12, 21, 22, 23



Control Module Adaption:

After the swap of the ESP/SPS/BAS or ESP/BAS control module (N47-5), it is important to perform the adaption procedure, since the control module must learn the values for the BAS solenoid valves. See HHT menu.

Diagnosis - Diagnostic Trouble Code (DTC) Memory

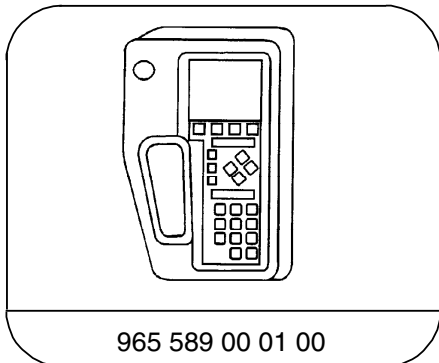
Preparation for DTC Readout

1. Review 11, 13, 20, 21, 23
2. Connect Star Diagnosis (Model 170 only), readout DTC memory,
3. For model 202, connect Hand-Held Tester (HHT) to data link connector (X11/4) according to connection diagram (review and see section 0) and read out DTC memory.
3. Ignition: **ON**



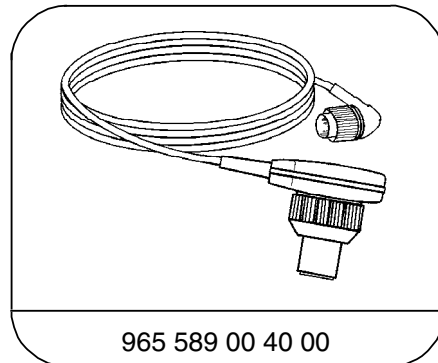
This section also applies to M.Y 2000 vehicles where ESP is standard.
 This section also applies to M.Y. 1999 vehicles where ESP was an **option**.
 The BAS control module is integrated into the ESP control module.
 Read out DTC memory for the BAS, ETS, ME and ETC systems.

Special Tools



965 589 00 01 00

Hand-Held-Tester



965 589 00 40 00

Test cable




Control Module Adaption:

After the swap of the ESP/SPS/BAS or ESP/BAS control module (N47-5) it is important to perform the adaption procedure, since the control module must learn the values for the BAS solenoid valves.
 See HHT menu.

Replacement/swap of ABS Lateral Acceleration Sensor (B43) and /or Rotating Speed Sensor (B45):


The Driving Test must be performed, see 11

Diagnosis - Diagnostic Trouble Code (DTC) Memory

DTC 		Possible cause	Test step/Remedy ¹⁾
–		No fault in system	In case of complaint: 23 (entire test).
┌ 1000	ESP/BAS	ESP/BAS control module (N47-5) or plausibility of ESP brake pressure sensors 1/2, (N34/1, N34/2) (perform control module adaption after replacing parts)	N47-5 23 ⇒ 4.0
┌ 1010	ESP/BAS	Battery voltage too low	23 ⇒ 1.0
┌ 1012	ESP/BAS	Battery voltage too high	23 ⇒ 1.0
┌ 1020	ESP	CAN communication overall faulty, faulty protocol	23 ⇒ 31.0
┌ 1022	BAS	CAN communication with engine control module (ME-SFI) (N3/10) interrupted.	Check version coding (vehicle and engine code), Read out DTC's from (N3/10)
┌ 1024	ESP	CAN communication with transmission control module (N15/3) interrupted.	Check version coding, Read out DTC's from (N15/3). 23 ⇒ 13.0
┌ 1025	BAS	CAN communication with BAS control module (N47-5) not possible due to ABS, vehicle version, wheel speed, or brake stop lamp signal not available. If there are other DTC stored in memory other then ┌ 1025, these are to be checked first since ┌ 1025 can be set due wheel speed signal missing.	23 ⇒ 13.0
┌ 1031	ESP	CAN communication with engine control module (ME-SFI) (N3/10) interrupted.	Check version coding, Read out DTC's from (N3/10), 23 ⇒ 13.0

¹⁾ Observe Preparation for Test, see 22.


Diagnosis - Diagnostic Trouble Code (DTC) Memory

DTC 	Possible cause	Test step/Remedy ¹⁾
C 1100	ESP Left front axle VSS sensor (L6/1), open circuit Left front axle VSS sensor (L6/1), loose connection Left front axle VSS sensor (L6/1), implausible ²⁾	Readout HHT Actual values.
C 1101	ESP Right front axle VSS sensor (L6/2), open circuit Right front axle VSS sensor (L6/2), loose connection Right front axle VSS sensor (L6/2), implausible ²⁾	Readout HHT Actual values.
C 1102	ESP Left rear axle VSS sensor (L6/3), open circuit Left rear axle VSS sensor (L6/3), loose connection Left rear axle VSS sensor (L6/3), implausible ²⁾	Readout HHT Actual values.
C 1103	ESP Right rear axle VSS sensor (L6/4), open circuit Right rear axle VSS sensor (L6/4), loose connection Right rear axle VSS sensor (L6/4), implausible ²⁾	Readout HHT Actual values.
C 1120	ESP ESP yaw rate sensor (N64), open circuit/short circuit, Plausibility, offset. There is no fault with the component if the following plausibility was present after the vehicle was driven through a steep turning curve, vehicle collision, or vehicle spin-out on slippery road surfaces.	Readout HHT Actual values, 23 ⇒ 6.0
C 1140	ESP Steering angle sensor (N49), Initialization, open circuit/short circuit, plausibility, offset. With offset fault: check vehicle tracking and adjustment of the steering box.	Turn steering wheel from lock to lock stop, in order to perform initialization. 23 ⇒ 3.0

¹⁾ Observe Preparation for Test, see 22.


²⁾ Rotor with incorrect tooth count, dirt accumulation on or damaged rotor, incorrect rear axle ratio, wrong wheel or tire size.
If DTC appears only after repair work, it was caused by applying the brakes or driving vehicle on a dynamometer, erase DTC.

Diagnosis - Diagnostic Trouble Code (DTC) Memory

DTC 	Possible cause	Test step/Remedy ¹⁾
C 1141	ESP ESP brake pressure sensor 1 (N34/1) or ESP brake pressure sensor 2 (N34/2) Open circuit/short circuit, implausible ²⁾	Readout HHT Actual values, 23 ⇒ 4.0
C 1142	ESP ABS lateral acceleration sensor (B24/2), Voltage supply, Plausibility, offset There is no fault with the component if the following plausibility was present after the vehicle was driven through a steep turning curve, vehicle collision, or vehicle spin-out on slippery road surfaces.	Readout HHT Actual values, 23 ⇒ 5.0
C 1149	ESP Output voltage for: ABS lateral acceleration sensor (B24/2), ESP yaw rate sensor (N64), ESP brake pressure sensors 1/2, (N34/1, N34/2).	23 ⇒ 5.0 23 ⇒ 6.0 23 ⇒ 4.0
C 1200	ESP Stop lamp switch (4-pole) (S9/1) Plausibility	23 ⇒ 11.0 23 ⇒ 12.0
C 1201	BAS Release switch (BAS) (A7/7s1) Open circuit/short circuit	Readout HHT Actual values, Wiring, A7/7s1
C 1202	ESP/BAS Release switch (BAS) (A7/7s1) Plausibility, vacuum system of brake booster leaks.	Readout HHT Actual values, Wiring, A7/7s1
C 1203	BAS Release switch (BAS) (A7/7s1) Redundancy/switchover time	Readout HHT Actual values, Wiring, A7/7s1

¹⁾ Observe Preparation for Test, see 22.

Diagnosis - Diagnostic Trouble Code (DTC) Memory

DTC 	Possible cause	Test step/Remedy ¹⁾
C 1204	BAS Membrane travel sensor (BAS) (A7/7b1) Open circuit/short circuit	Readout HHT Actual values, 23 ⇒ 7.0
C 1205	BAS Membrane travel sensor (BAS) (A7/7b1) Plausibility	Readout HHT Actual values, 23 ⇒ 7.0
C 1206	BAS Membrane travel sensor (BAS) (A7/7b1) Membrane speed	Readout HHT Actual values, 23 ⇒ 7.0
C 1207	BAS Stop lamp switch (4-pole) (S9/1) Plausibility with membrane travel comparison	23 ⇒ 11.0, 23 ⇒ 12.0
C 1332	BAS Solenoid valve (BAS) (A7/7y1), Open/short circuit, A7/7y1 sticks or vacuum is not present. Allow engine to run for a few minutes in order to build up a vacuum, should the fault not re-appear, erase the DTC.	23 ⇒ 8.0
C 1527	ESP Implausible ESP control function (duration: > 15 seconds). There is not fault with the components, if no other DTC is present, erase DTC memory.	
C 1529	ESP Pressurization of system via solenoid valve (A7/7y1) for BAS not possible.	23 ⇒ 8.0

1) Observe Preparation for Test, see 22.

Diagnosis – Complaint Related Diagnostic Chart

 **WARNING!**

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 **CAUTION!**

Risk of severe injury, due to uneven placement of lift arms/lift arm supports, as well as the support and lifting of vehicle components, there is the possibility of the vehicle slipping while on the lift.

 **CAUTION!**

Danger of vehicle toppling off of lift due to irregular weight distribution after the removal of components and axles.

Protective measures:

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- Prior to lift vehicle completely (wheels still in contact with floor), ensure that the lift arm supports are correctly placed onto the vehicle contact points.
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- Basically obey all the rules/guide lines regarding the lifting of vehicles as stated in the operator's manual by the lift manufacturer.



Control Module Adaption:

After the swap of the ESP/SPS/BAS or ESP/BAS control module (N47-5), it is important to perform the adaption procedure, since the control module must learn the values for the BAS solenoid valves. See HHT menu.

Diagnosis – Complaint Related Diagnostic Chart


Preparation for Test

1. Review 11, 13, 20, 21, 23

Complaint/Problem	Possible cause	Test step/Remedy ¹⁾
Communication via the HHT is not possible.		23 ⇒ 1.0, 23 ⇒ 2.0
BAS/ESP MIL (A1e47) or ABS MIL (A1e17) do not illuminate when ignition switch is turned ON.	Lamp(s), instrument cluster (A1)	Readout DTC's for ESP control module, using HHT, See 12 Readout DTC's for instrument cluster (A1).
BAS/ESP MIL (A1e47) or ABS MIL (A1e17) illuminates while driving and then goes out.	Vehicle system voltage < 10 V briefly.	Check generator (G2), Read out DTC's for ESP control module, using HHT, See 12
ESP warning lamp (A1e41) briefly blinks while driving.	ESP function to stabilize vehicle while driving has occurred.	Read out DTC's for ESP control module, using HHT, See 12
BAS/ESP MIL (A1e47) or ABS MIL (A1e17) will illuminate when the engine is running or while driving and will not go out.	CA communication interrupted, component fault.	Read out DTC's for ESP control module. See 12
ABS MIL (A1e17) illuminate with engine running after brake test or dynamometer use.	Nonplausible rpm signal due to different rpm at front and rear axles. Prior to running vehicle on dynamometer activate the diagnostic tools of dynamometer test program within ESP/SPS control module (N47-5).	Readout DTC's for ESP control module and erase DTCs as necessary. See 12

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Complaint Related Diagnostic Chart

Complaint/Problem	Possible cause	Test step/Remedy ¹⁾
<p>BAS/ESP MIL (A1e47) illuminates after driving and after readout of DTC memory, the DTCs C1142 and C1120 are set.</p>	<p>Driving through steep turning curves, Vehicle collision, Vehicle spin-out on slippery road surfaces.</p> <p> In this case the DTCs can be ignored.</p>	<p>Readout DTC's for ESP control module and erase DTCs as necessary. See 12</p>

¹⁾ Observe Preparation for Test, see 22.

10.5 Electronic Stability Program (ESP)

Models 170, 202 (with engine 111) as of M.Y. 2000

Important CAN data outputs *FROM* the ESP control module (N47-5)

CAN signal	Information
ABS/ESP status	<ul style="list-style-type: none">Increase or reduction of specified engine torque
ABS/ESP status	<ul style="list-style-type: none">Transmission shift requirements
ABS/ESP status	<ul style="list-style-type: none">Activation of MIL and warning lamps: ABS, BAS, ESPSignals from lamps indicate: faults or proper function
ABS/ETS/ESP status	<ul style="list-style-type: none">Stop lamp switch (S9/1): Brake not operated Brake operated No signal
ABS/ETS/ESP status	<ul style="list-style-type: none">Cruise control function OFF
Left front wheel vehicle speed signal (VSS)	Wheel speed
Right front wheel vehicle speed signal (VSS)	Wheel speed
Rear left wheel vehicle speed signal (VSS)	Wheel speed
Rear right wheel vehicle speed signal (VSS)	Wheel speed
Left front wheel speed signal for CC	Wheel speed
Right front wheel speed signal for CC	Wheel speed

10.5 Electronic Stability Program (ESP)

Models 170, 202 (with engine 111) as of M.Y. 2000

Important data *TO* the ESP control module (N47-5) via CAN

CAN signal	Information	From control module
Engine status	<ul style="list-style-type: none">• Pedal value	<ul style="list-style-type: none">• Engine control module
Vehicle code	<ul style="list-style-type: none">• Model• Version code• Engine• Transmission	<ul style="list-style-type: none">• Engine control module
Engine status	<ul style="list-style-type: none">• Engine rpm	<ul style="list-style-type: none">• Engine control module
Engine status	<ul style="list-style-type: none">• Indicated engine torque	<ul style="list-style-type: none">• Engine control module
Engine status	<ul style="list-style-type: none">• Maximum and minimum engine torque for current operational point	<ul style="list-style-type: none">• Engine control module
Engine status	<ul style="list-style-type: none">• Engine friction torque	<ul style="list-style-type: none">• Engine control module
Engine status	<ul style="list-style-type: none">• Engine torque as specified by driver	<ul style="list-style-type: none">• Engine control module

Electrical Test Program – ESP Hydraulic Component Locations

Model 202 with engine 111 shown

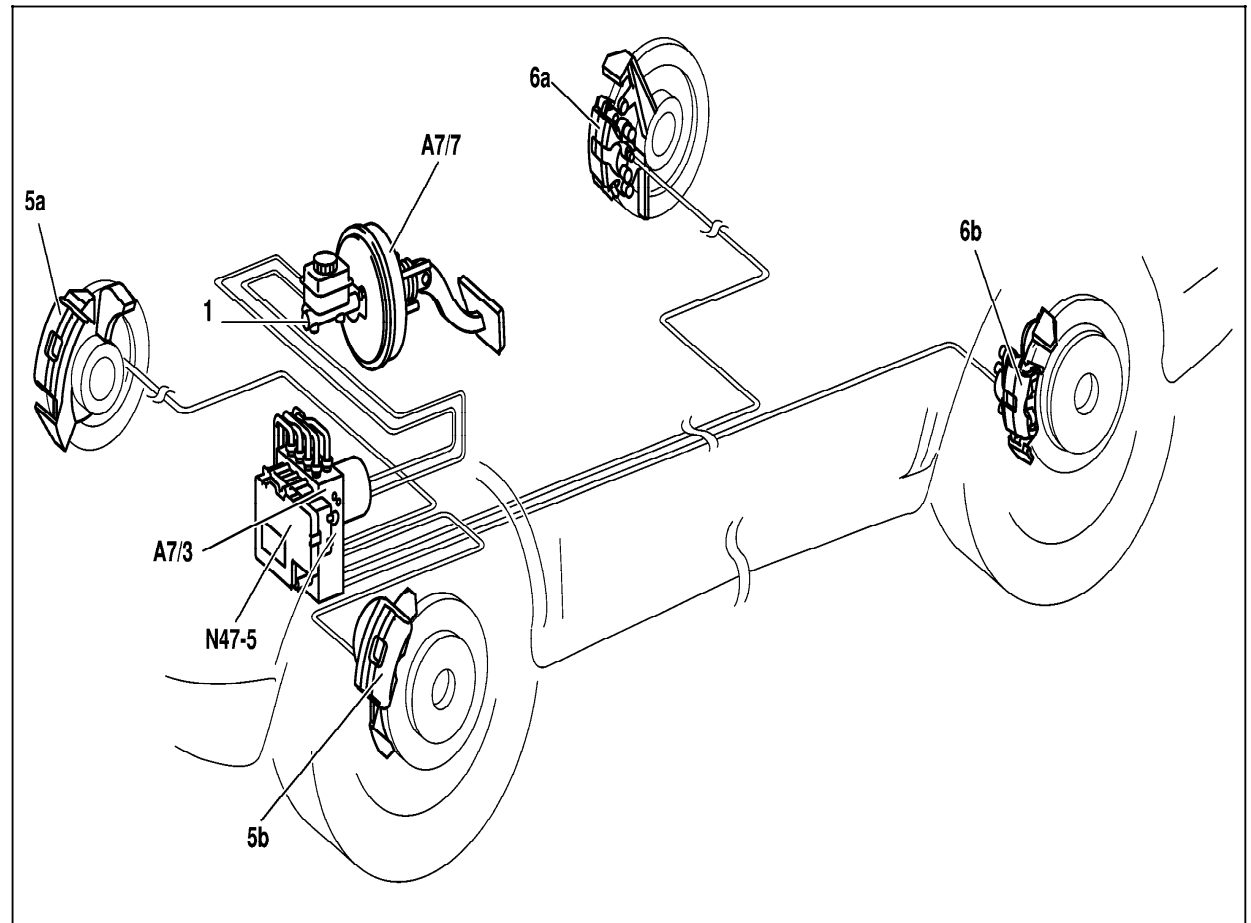


Figure 1

- 1 Tandem master cylinder
- 5a Right front brake caliper
- 5b Left front brake caliper
- 6a Right rear brake caliper
- 6b Left rear brake caliper
- A7/3 ASR/VTS/ESP hydraulic unit for traction systems
- A7/7 Brake booster (BAS)

P42.45-2198-09

Electrical Test Program – ESP Hydraulic Component Locations

Model 170 with engine 111 shown

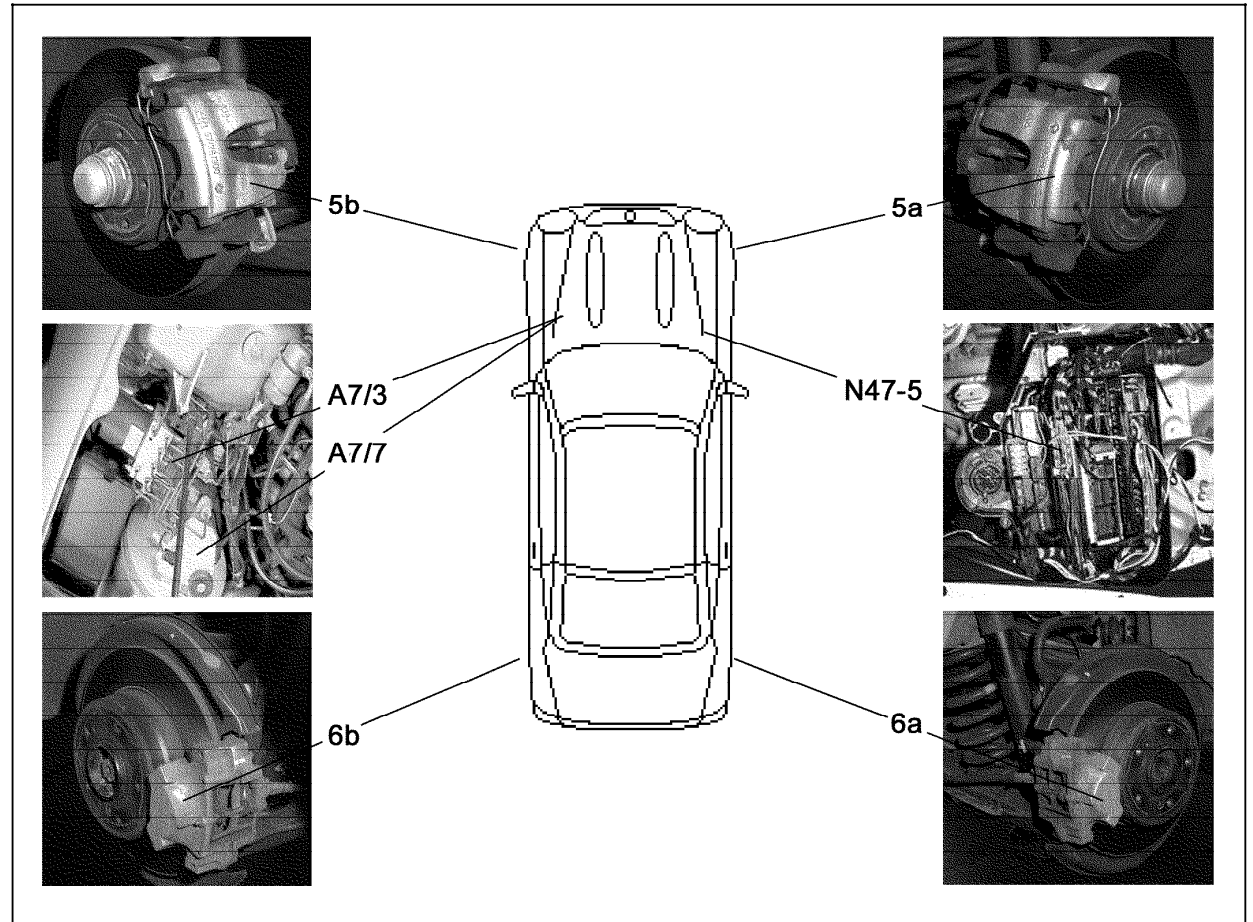


Figure 2

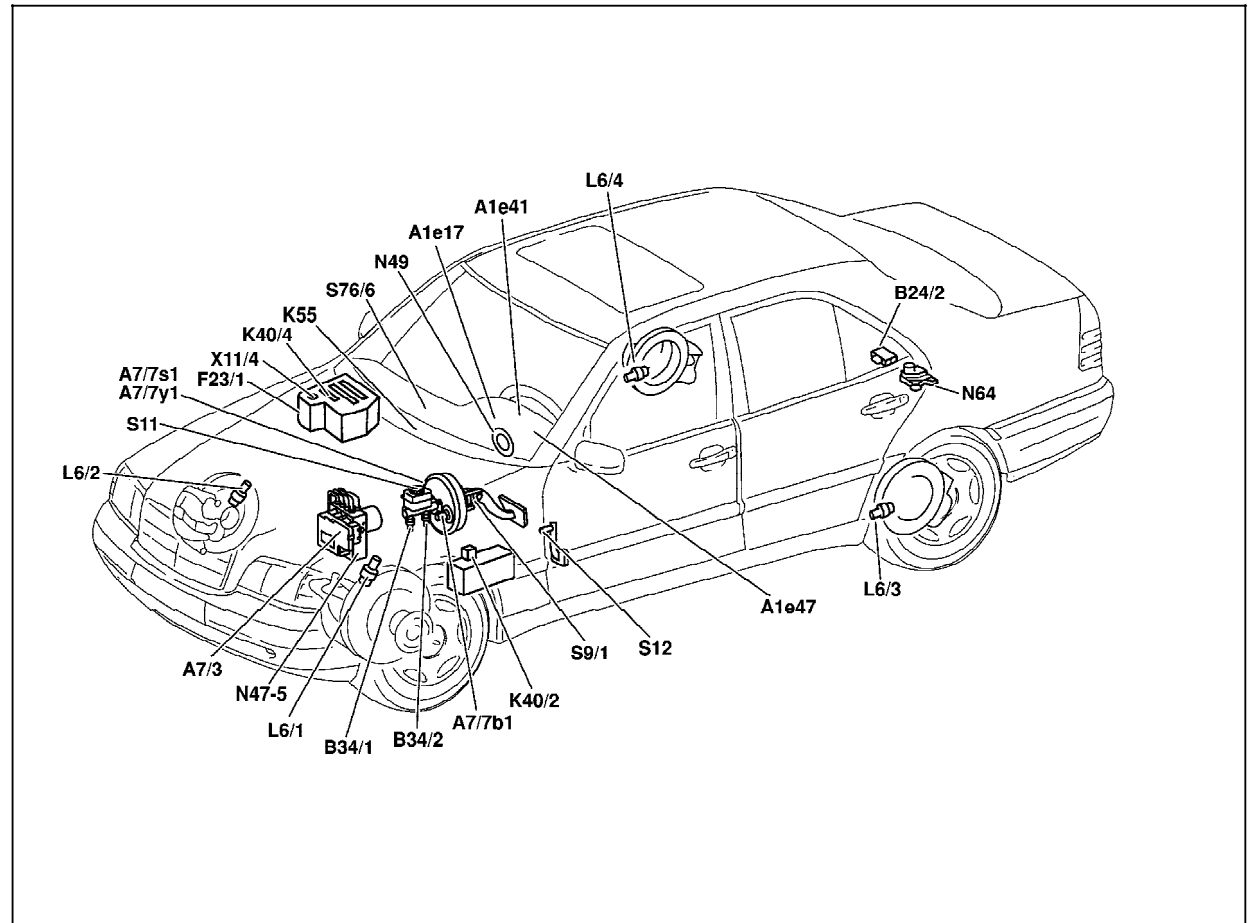
P42.45-1504-06x

Electrical Test Program – ESP Electronic Component Locations

Model 202 shown

Figure 3

A1e17	ABS MIL
A1e41	ESP warning lamp
A1e47	BAS/ESP MIL
A7/3	ASR/ETS/ESP hydraulic unit
A7/7b1	Membrane travel sensor (BAS)
A7/7s1	Release switch (BAS)
A7/7y1	Solenoid valve (BAS)
B24/2	ABS lateral acceleration sensor
B34/1	ESP brake pressure sensor 1
B34/2	ESP brake pressure sensor 2
F23/1	Control module box
K40/2	Driver's side fuse and relay module box
K40/4	Passenger-side fuse and relay module box
K55	Stop lamp suppression relay module
L6/1	Left front VSS
L6/2	Right front VSS
L6/3	Left rear VSS
L6/4	Right rear VSS
N47-5	ESP/BAS control module
N64	ESP yaw rate sensor
N49	Steering angle sensor
S9/1	Stop lamp switch (4-pole)
S11	Brake fluid level switch
S12	Parking brake switch
S76/6	ESP OFF switch
X11/4	Data link connector (DTC readout)



P42.45-2199-09

Electrical Test Program – Preparation for Test

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Protective measures:

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- Prior to removing the axles or components from the vehicle while on the lift, secure the vehicle to the lift arms or place sand bags inside the vehicle to ensure proper weight distribution to prevent toppling of the vehicle from the lift.
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10.5 Electronic Stability Program (ESP)

Models 170, 202 (with engine 111) as of M.Y. 2000

Electrical Test Program – Preparation for Test

1. Review 11, 13, 20, 21, 22, 23
2. Additionally review section 0,
3. Ignition: **OFF**

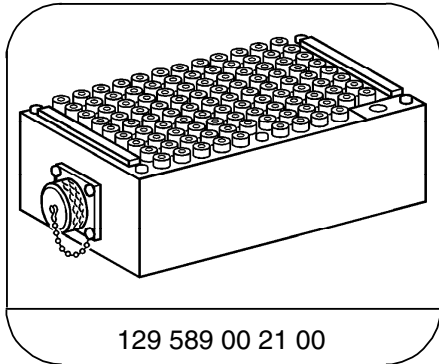
Electrical Wiring Diagrams:

(location of grounds and connectors).

Electrical Troubleshooting Manual, Model 170,

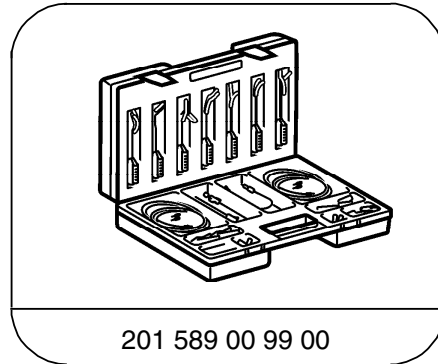
Electrical Troubleshooting Manual, Model 202/208, Vol. 2

Special Tools



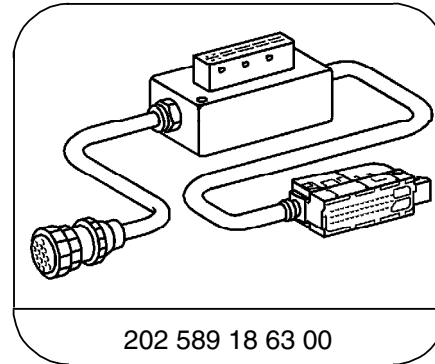
129 589 00 21 00

126-pin socket box



201 589 00 99 00

Electrical connecting set



202 589 18 63 00

Test cable 47-pin

Test equipment; See MBUSA Standard Service Equipment Program

Description	Brand, model, etc.
Digital multimeter	Fluke models 23, 77 III, 83, 85, 87

Electrical Test Program – Preparation for Test

Connection Diagram – Socket Box



Prior to connecting the socket box and test cables, turn off the ignition.

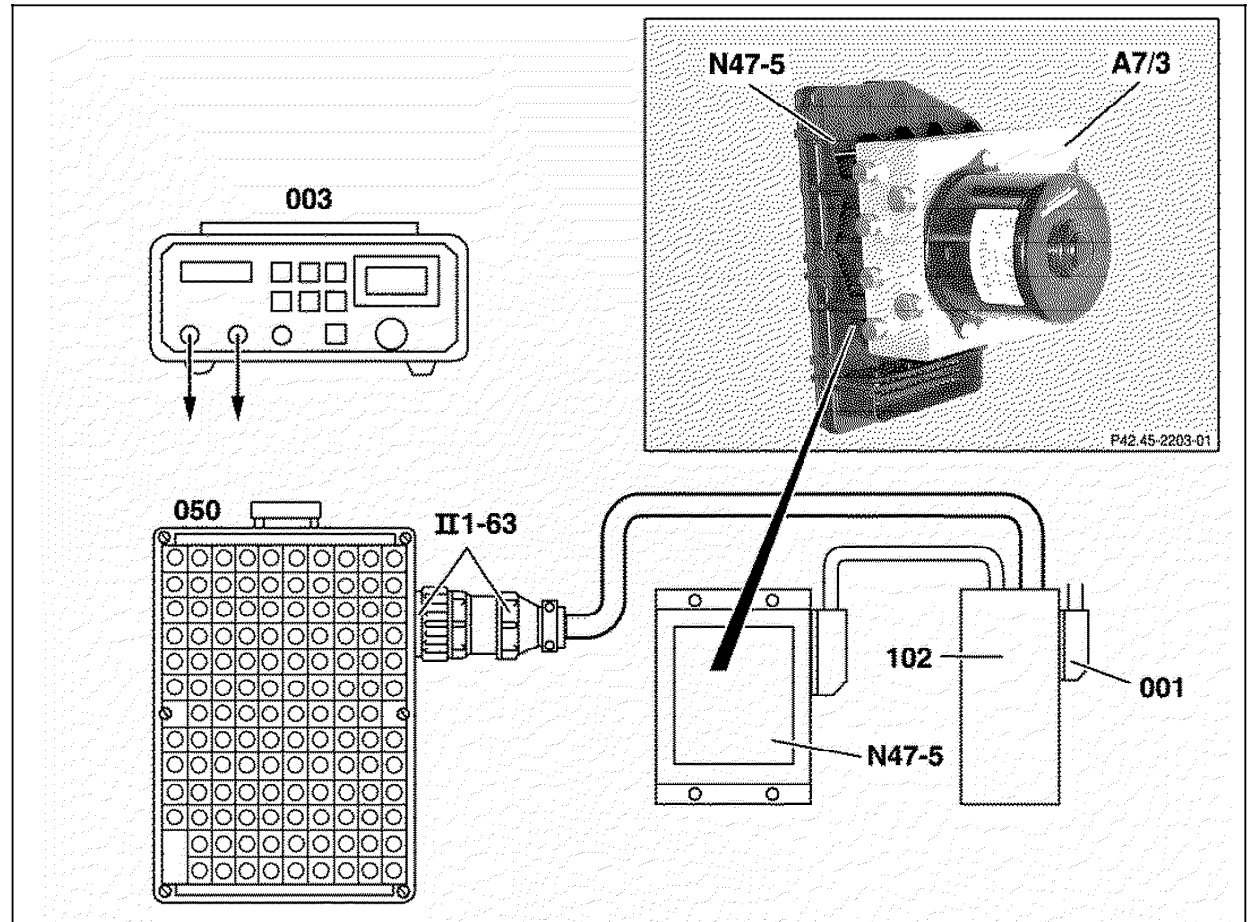


Figure 1

- 001 Control module connector
- 003 Digital multimeter
- 050 Socket box, 126-pole
- 102 Test cable

- A7/3 ASR/ETS/ESP control module
- N47-5 ESP/BAS control module

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





10.5 Electronic Stability Program (ESP)

Models 170, 202 (with engine 111) as of M.Y. 2000

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		ESP control module (N47-5) Circuit 30 Voltage supply from fuse and relay box (F23/1)		In order to apply a load onto the voltage source: ignition: ON	11 – 14 V	Wiring, Fuse f9 and F8 in F23/1, for model 202, Fuse f3 in F31 for model 170, Values >14 V: check generator (G1).
1.1		Voltage supply for circuit 87 from passenger-side fuse and relay module box (K40/4).		Ignition: ON	11 – 14 V	Wiring, Fuse in K40/4 for model 202, Fuse f1 in K40k5 for model 170.
2.0		Diagnostic output Resistance of K harness		Ignition: OFF Disconnect N47-5 from test cable.	< 1 Ω	Wiring, Passenger-side fuse and relay module box (K40/4).
3.0		Steering angle sensor (N49)		Ignition: OFF Disconnect connector at N49.	11 – 14 V	Wiring. Fuse f13 in F1 for model 170.


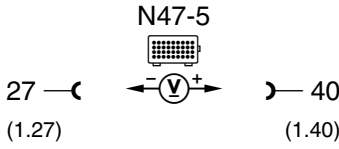

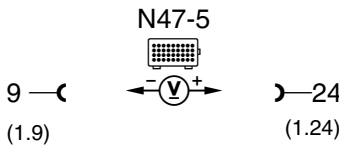

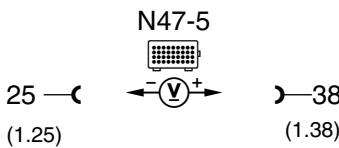

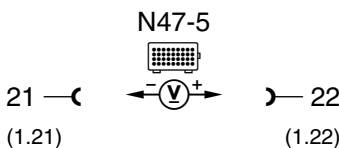

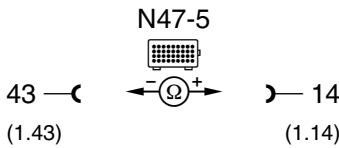
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
3.1		Voltage supply Circuit 87 Model 202:	3—  —2	Ignition: ON	11 – 14	Wiring.
		Model 170:	2—  —3			
4.0		ESP brake pressure sensor 1 ESP brake pressure sensor 2 Actual values: brake pressure		Ignition: ON Readout brake pressures for B34/1 and B34/2 brake not applied: B34/1 B34/2	-7 to +7 bar -7 to +7 bar	Wiring, B34/1, B34/2 ⇒ 4.1, ⇒ 4.2, ⇒ 4.3
4.1		Plausibility of the brake pressure signals		Ignition: ON Readout brake pressures for B34/1 and B34/2 and determine the difference between the two values. Apply medium pedal pressure.	-20 to +20 bar	Wiring, B34/1, B34/2 ⇒ 4.2, ⇒ 4.3 Other possible faults: Brake fluid aged, fluid leak or air in lines of one of the brake circuits.
4.2		Voltage supply for B34/1 from ESP control module (N47-5)	11—  —26 (1.11) (1.26)	Ignition: ON	4.75 – 5.25 V	Wiring, B34/1 (short circuit), N47-5.

10.5 Electronic Stability Program (ESP)

Models 170, 202 (with engine 111) as of M.Y. 2000




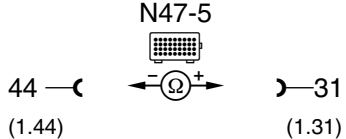

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
4.3		Voltage supply for B34/2 from ESP control module (N47-5)		Ignition: ON	4.75 – 5.25 V	Wiring, B34/2 (short circuit), N47-5
5.0		ABS lateral acceleration sensor (B24/2) Voltage supply from ESP control module (N47-5)		Ignition: ON	4.75 – 5.25 V	Wiring, B34/2 (short circuit), N47-5, Connector X99/4 om model 170
6.0		ESP yaw rate sensor (N64) Voltage supply from ESP control module (N47-5)		Ignition: ON	4.75 – 5.25 V	Wiring, N64 (short circuit), N47-5
7.0		Membrane travel sensor (BAS) (A7/7b1) Supply voltage from N47-5		Ignition: ON	4.75 – 5.25 V	Wiring, A7/7b1 (short circuit), N47-5
8.0		Solenoid valve (BAS) (A7/7y1) Resistance		Ignition: ON Disconnect ESP control module (N47-5) from test cable.	1 – 2 Ω	Wiring, Brake booster for A7/7y1

10.5 Electronic Stability Program (ESP)

Models 170, 202 (with engine 111) as of M.Y. 2000












Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
9.0		ESP OFF switch (S76/6)		S76/6 in position: ON Hold pressed: At rest: S76/6 in position: OFF Hold pressed:	0.75 – 3.5 V > 3.5 V < 0.75 V	Wiring, S76/6
10.0		Parking brake switch (S12) and low brake fluid level and parking brake indicator lamp (A1e7)		Engine: at idle Apply parking brake pedal: Parking brake pedal not apply:	00 Parking brake warning lamp (A1e7): ON 000 (A1e7): OFF	Wiring, S12, ⇒ 10.1 A1e7, readout actual values of instrument cluster (A1)
10.1		Resistance	N47-5 	Ignition: OFF Disconnect (N47-5) from test cable. Parking brake is not activated: Parking brake activated:	> 20 kΩ < 1 Ω	Wiring, S12
11.0	ESP: C1200 BAS: C1207	Stop lamp switch (S9/1) Closed (N.C.)		Service brake: Not applied: Applied:	000 00	Wiring, S9/1, ESP stop lamp suppression relay (K55), 23 ⇒ 12.0 ESP control module (N47-5).


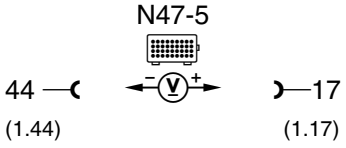
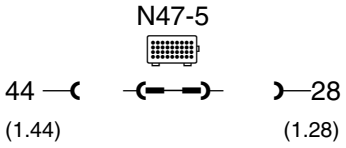
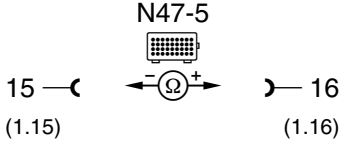
10.5 Electronic Stability Program (ESP)

Models 170, 202 (with engine 111) as of M.Y. 2000

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
11.1		Open (N.O.)		Service brake: Not applied:  Applied: 		Wiring, Voltage supply to passenger-side fuse and relay module box (K40/4) S9/1: 23 ⇒ 12.0
12.0		Stop lamp suppression relay module (K55) Voltage supply for circuit 15 from fuse and relay module box (F1) for the circuit of K55	 N47-5  5	Ignition: ON K55 disconnected. Measure at plug socket for K55	11 – 14 V	Wiring Fuse in fuse and relay module box (F1).
12.1		Voltage supply for circuit 15 from F1 for the control circuit of K55	 N47-5  6	Ignition: ON K55 disconnected. Measure at plug socket for K55	11 – 14 V	Wiring Fuse in fuse and relay module box (F1).
12.2		Signal from S9/1 (N.C.)	44 —  N47-5 (1.44)  17 (1.17)	Ignition: ON K55 reconnected. Service brake not applied: Service brake applied:	< 3 V 11 – 14 V	Wiring, Stop lamp suppression relay module (K55), S9/1

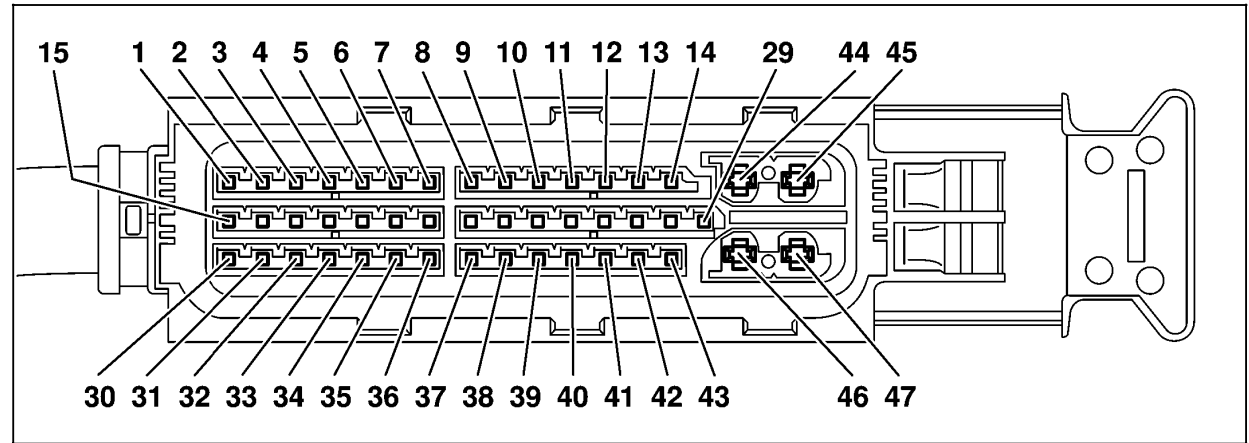
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
12.3		Signal from S9/1 (N.O.)	<p>N47-5</p> 	Ignition: ON K55 reconnected. Service brake not applied: Service brake applied:	11 – 14 V < 3 V	Wiring, Voltage supply from passenger-side fuse and relay module (K40/4) to S9/1, S9/1
12.4		Activation of K55	<p>N47-5</p> 	Ignition: ON Press service brake: Bridge not connected: Bridge connected:	Stop lamp ON Stop lamp OFF	Wiring, K55
13.0	ESP/ BAS: C 1022 ESP: C 1020 C 1024 C 1031 BAS: C 1025	CAN data lines and Endstage resistance	<p>N47-5</p> 	Ignition: OFF	55 – 65 Ω	CAN lines, Endstage resistance of injection system control module (N3), Endstage resistance of electronic ignition-switch (EIS) control module (N73), Readout DTC memory of the corresponding control modules.

Electrical Test Program – Test

Connector Layout

ESP control module (N47-5)



P42.45-2201-04

Connector 2

1	Stop lamp switch (S9/1) N.C. contact N.O.	21	Membrane travel sensor (BAS) (A7/7b1) (-)	37	Membrane travel sensor (BAS) (A7/7b1) signal
2	Left front brake pad wear sensor (S10/1), right (S10/2)	22	Membrane travel sensor (BAS) (A7/7b1) (+)	38	ESP yaw rate sensor (N64) (+)
3	Left front axle VSS sensor (L6/1) (-)	23	Release switch (BAS) (A7/7s1), signal	39	ESP yaw rate sensor (N64), signal
4	Left front axle VSS sensor (L6/1) (+)	24	ABS lateral acceleration sensor (B24/2) (+)	40	ESP brake pressure sensor 2 (B34/2) (+)
5	Left front VSS output	25	ESP yaw rate sensor (N46), (-)	41	ESP brake pressure sensor 2 (B34/2), signal
6	Left rear axle VSS sensor (L6/3) (+)	26	ESP brake pressure sensor 1 (B34/1) (+)	42	Release switch (BAS) (A7/7s1), N. C. contact
7	Left rear axle VSS sensor (L6/3) (-)	27	ESP brake pressure sensor 2 (B34/2) (-)	43	Solenoid valve (BAS) (A7/7y1) (-)
8	Diagnostic output (K-line)	28	Stop lamp suppression relay module (K55), control circuit, (-)	44	Ground W16/3
9	ABS lateral acceleration sensor (B24/2) (-)	29	Steering angle sensor (N49), signal	45	Circuit 30, voltage supply
10	ABS lateral acceleration sensor (B24/2), signal	30	ESP OFF switch (S76/6)	46	Ground W16/3
11	ESP brake pressure sensor (B34/1) (-)	31	Parking brake switch (S12)	47	Circuit 30, voltage supply
12	ESP brake pressure sensor (B34/1) (signal)	32	Right front axle VSS sensor (L6/2) (-)		
13	Release switch (BAS) (A7/7s1), N. O. contact	33	Right front axle VSS sensor (L6/2) (+)		
14	Solenoid valve (BAS) (A7/7y1) (+)	34	Right front axle VSS output		
15	CAN data line, low (-)	35	Right rear axle VSS sensor (L6/4) (+)		
16	CAN data line High (+)	36	Right rear axle VSS sensor (L6/4) (-)		
17	Stop lamp switch (S9/1) N.C.				
18	Circuit 87 voltage supply				
19-20	—				