Volkswagen   Passat (88-96) 2,0 1990-93
Engine code: 2E

System type: VAG Digifant

- Service adjustments
- Fuel system
- Intake system
- Ignition system
- Engine sensors
- Emission control system
- Control system
  - Engine control relay
  - Fuel pump relay
  - Engine control module (ECM)

Engine control relay

Checking operation - Fig. 35

Technical Data		
Terminals	Condition	Resistance
30 & 87	Battery voltage disconnected	∞
30 & 87	Battery voltage connected	Zero
Battery + to terminal 86 or 86a		
Battery - to terminal 85		

NOTE: Ensure battery voltage supply is connected correctly. Otherwise relay could be damaged.

- Ensure ignition switched OFF.
- Remove relay.
- Check resistance between relay terminals.
- Connect battery voltage supply to specified relay terminals.
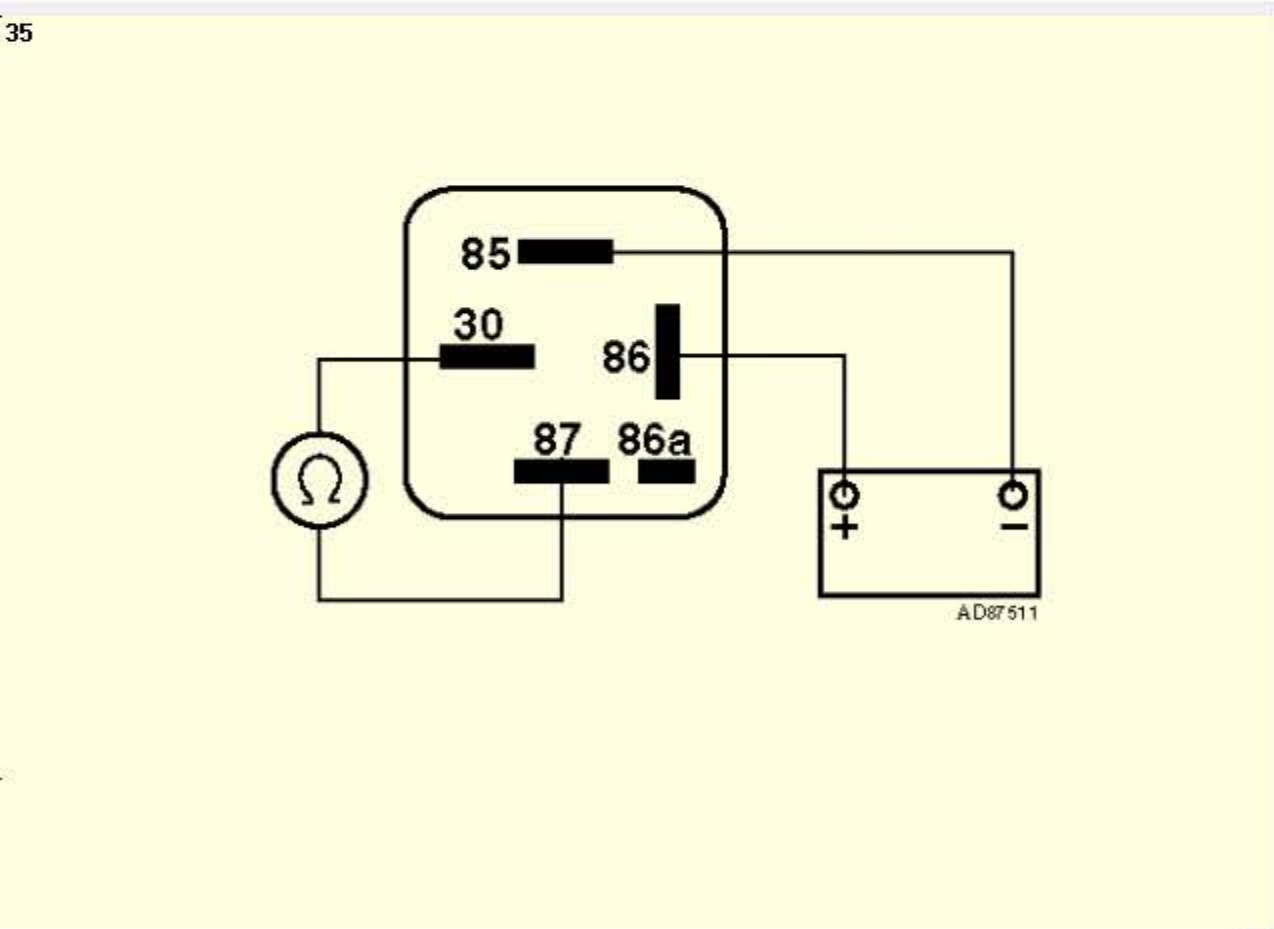- Check resistance between relay terminals.

Checking supply voltage - Fig. 36

Technical Data		
Terminals	Condition	Voltage
4 & earth	Ignition OFF	Battery voltage
3 & earth	Ignition ON	Battery voltage

- Switch ignition ON.
- Relay should be heard to operate.
- If relay is not heard to operate:
- Switch ignition OFF. Remove relay.
- Check voltage between relay base terminal and earth.
- Switch ignition ON.
- Check voltage between relay base terminal and earth.
- If voltage not as specified: Check wiring.

Checking earth connection - Fig. 36

Technical Data	
Terminals	Resistance
1 & earth	Zero

35

AD87511

F1 F2 F3 F4 F5 F6 F7 F8 F9 F11 Ctrl+F4 Ctrl+F8

- Service adjustments
- Fuel system
- Intake system
- Ignition system
- Engine sensors
- Emission control system
- Control system
  - **Engine control relay**
  - **Fuel pump relay**
  - **Engine control module (ECM)**

Technical Data

Terminals	Condition	Resistance
30 & 87	Battery voltage disconnected	∞
30 & 87	Battery voltage connected	Zero
Battery + to terminal 86 or 86a		
Battery - to terminal 85		

NOTE: Ensure battery voltage supply is connected correctly. Otherwise relay could be damaged.

- Ensure ignition switched OFF.
- Remove relay.
- Check resistance between relay terminals.
- Connect battery voltage supply to specified relay terminals.
- Check resistance between relay terminals.

Checking supply voltage - Fig. 36

Technical Data

Terminals	Condition	Voltage
4 & earth	Ignition OFF	Battery voltage
3 & earth	Ignition ON	Battery voltage

- Switch ignition ON.
- Relay should be heard to operate.
- If relay is not heard to operate:
- Switch ignition OFF. Remove relay.
- Check voltage between relay base terminal and earth.
- Switch ignition ON.
- Check voltage between relay base terminal and earth.
- If voltage not as specified: Check wiring.

Checking earth connection - Fig. 36

Technical Data

Terminals	Resistance
1 & earth	Zero

- Ensure ignition switched OFF.
- Remove relay.
- Check resistance between relay base terminal and earth.
- If resistance not as specified: Check wiring.

35

85
30
86
87 86a
AD87511

Service adjustments

Fuel system

Intake system

Ignition system

Engine sensors

Emission control system

Control system

- Engine control relay
- Fuel pump relay
- Engine control module (ECM)

Fuel pump relay

Checking operation - Fig. 37

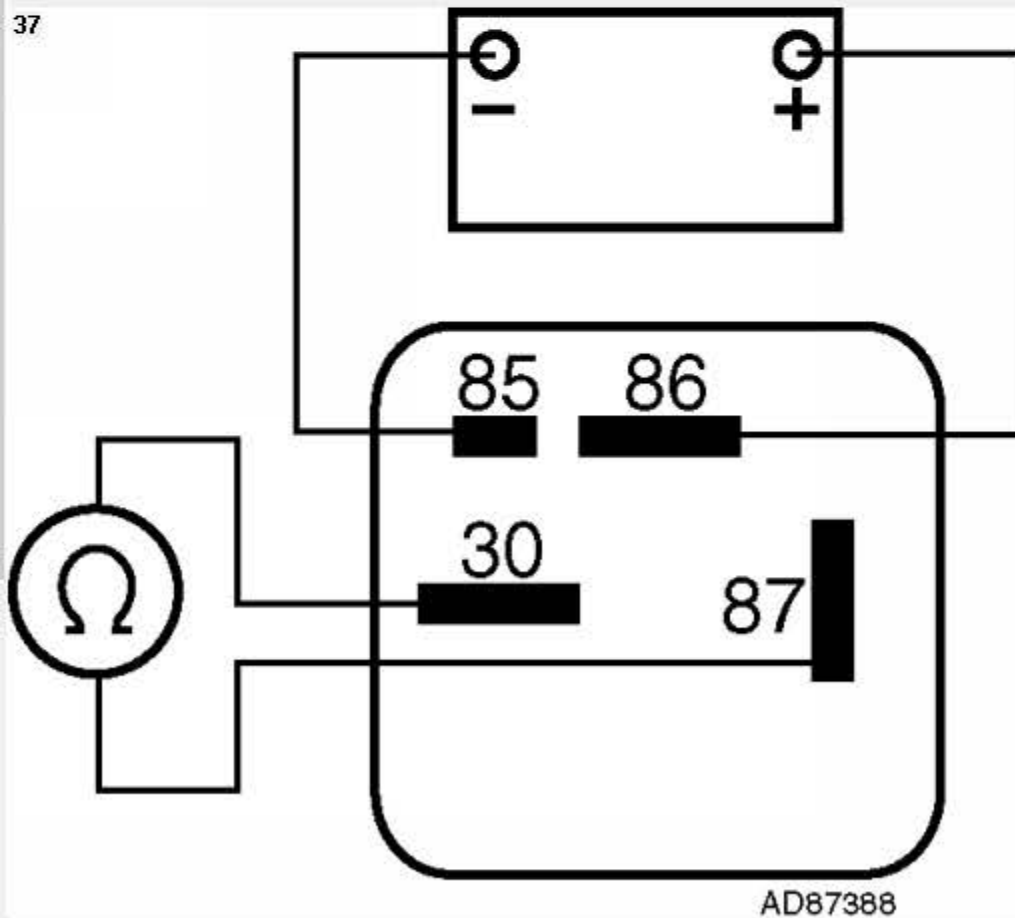| Technical Data		
Terminals	**Condition**	**Resistance**
30 & 87	Battery voltage disconnected	∞
30 & 87	Battery voltage connected	Zero
Battery + to terminal 86		
Battery - to terminal 85		

NOTE: Ensure battery voltage supply is connected correctly. Otherwise relay could be damaged.

- Ensure ignition switched OFF.
- Remove relay.
- Check resistance between relay terminals.
- Connect battery voltage supply to specified relay terminals.
- Check resistance between relay terminals.

Checking supply voltage - Fig. 38

Technical Data		
Terminals	**Condition**	**Voltage**
6 & earth	Ignition OFF	Battery voltage
2 & earth	Ignition ON	Battery voltage

- Ensure ignition switched OFF.
- Remove relay.
- Check voltage between relay base terminal and earth.
- Switch ignition ON.
- Check voltage between relay base terminal and earth.
- If voltage not as specified: Check wiring.

37

AD87388

- Service adjustments
- Fuel system
- Intake system
- Ignition system
- Engine sensors
- Emission control system
- Control system
  - Engine control relay
  - Fuel pump relay
  - Engine control module (ECM)

Engine control module (ECM)

NOTE: Trouble codes must be erased after completion of ECM tests. Refer to Self-diagnosis section.
NOTE: Due to small size of ECM harness multi-plug pins it is advisable to use a breakout box.

Checking supply voltage - Passat - Fig. 39

Technical Data		
Terminals	**Condition**	**Voltage**
36 & earth	Ignition ON	Battery voltage
38 & earth	Ignition ON	Battery voltage
26 & earth	Engine cranking	9 V approx.

NOTE: Engine control relay must be fitted and working correctly in order to carry out supply voltage checks.

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug.
- Connect breakout box to ECM harness multi-plug.
- Switch ignition ON.
- Check voltage between breakout box terminals and earth.
- Briefly crank engine.
- Check voltage between breakout box terminal and earth.
- If voltage not as specified: Check wiring, fuses and relays.

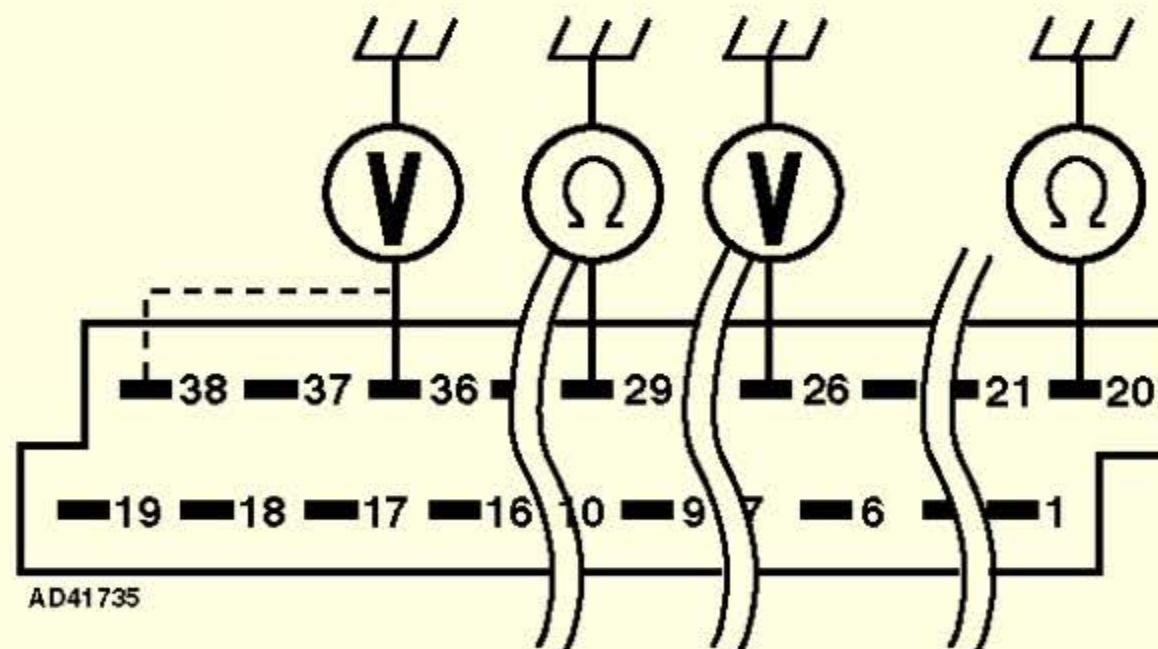### Checking earth connection - Passat 1990-93 - Fig. 39

Technical Data	
Terminals	**Resistance**
20 & earth	Zero
29 & earth	Zero

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug.
- Connect breakout box to ECM harness multi-plug.
- Check resistance between breakout box terminals and earth.
- If resistance not as specified: Check wiring.

Checking earth connection - Passat 1994-95 - Fig. 39

Technical Data	
Terminals	**Resistance**

39

AD41735

Service adjustments

Fuel system

Intake system

Ignition system

Engine sensors

Emission control system

Control system

- Engine control relay
- Fuel pump relay
- Engine control module (ECM)

Technical Data	
Terminals	**Resistance**
20 & earth	Zero
29 & earth	Zero

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug.
- Connect breakout box to ECM harness multi-plug.
- Check resistance between breakout box terminals and earth.
- If resistance not as specified: Check wiring.

Checking earth connection - Passat 1994-95 - Fig. 39

Technical Data	
Terminals	**Resistance**
20 & earth	Zero

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug.
- Connect breakout box to ECM harness multi-plug.
- Check resistance between breakout box terminal and earth.
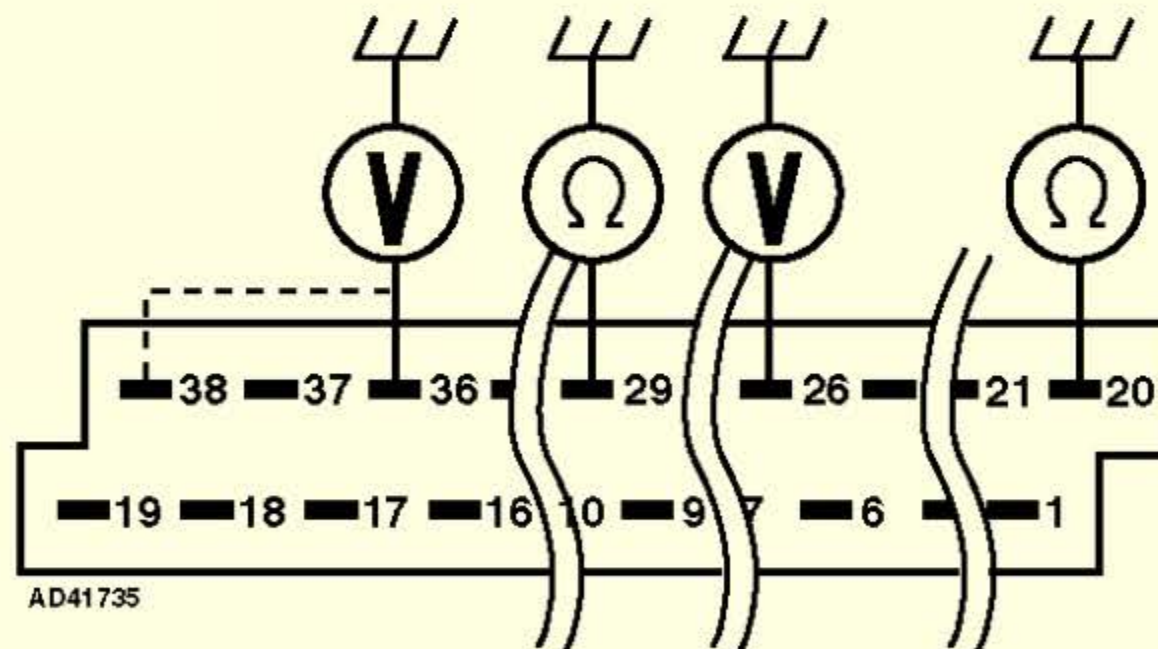- If resistance not as specified: Check wiring.

Checking supply voltage - Golf/Vento & Corrado - Fig. 40

Technical Data		
Terminals	**Condition**	**Voltage**
8 & earth	Ignition ON	Battery voltage
23 & earth	Ignition ON	Battery voltage
32 & earth	Engine cranking	9 V approx.

NOTE: Engine control relay must be fitted and working correctly in order to carry out supply voltage checks.

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug.
- Connect breakout box to ECM harness multi-plug.
- Switch ignition ON.
- Check voltage between breakout box terminals and earth.
- Briefly crank engine.
- Check voltage between breakout box terminal and earth.
- If voltage not as specified: Check wiring, fuses and relays.

39

AD41735

- Service adjustments
- Fuel system
- Intake system
- Ignition system
- Engine sensors
- Emission control system
- Control system
  - Engine control relay
  - Fuel pump relay
  - Engine control module (ECM)

Technical Data	
Terminals	Resistance
20 & earth	Zero

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug.
- Connect breakout box to ECM harness multi-plug.
- Check resistance between breakout box terminal and earth.
- If resistance not as specified: Check wiring.

Checking supply voltage - Golf/Vento & Corrado - Fig. 40

Technical Data		
Terminals	Condition	Voltage
8 & earth	Ignition ON	Battery voltage
23 & earth	Ignition ON	Battery voltage
32 & earth	Engine cranking	9 V approx.

NOTE: Engine control relay must be fitted and working correctly in order to carry out supply voltage checks.

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug.
- Connect breakout box to ECM harness multi-plug.
- Switch ignition ON.
- Check voltage between breakout box terminals and earth.
- Briefly crank engine.
- Check voltage between breakout box terminal and earth.
- If voltage not as specified: Check wiring, fuses and relays.

Checking earth connection - Golf/Vento & Corrado - Fig. 40

Technical Data	
Terminals	Resistance
1 & earth	Zero

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug.
- Connect breakout box to ECM harness multi-plug.
- Check resistance between breakout box terminal and earth.
- If resistance not as specified: Check wiring.

AD41735