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E46 Power Supply and Bus Systems

Model: E46

Production: From Start of Production

OBJECTIVES

After completion of this module you will be able to:

- Understand the power supply systems in the E46
- Understand the Bus networks used in the E46
- Identify and Locate power supply components on the E46

E46 Power Supply

The power supply system in the E46 is used to supply power and ground to the various components and systems. Some of the components include:

- Front power distribution box (fusebox)
- Battery and battery cables
- Grounding points
- Main fuse located in trunk
- Battery Safety Terminal
- Alternator (Generator)

Front Power Distribution

The main (front) fuse box is located behind the glovebox. The fuse panel is accessed by rotating two twist locks 90 degrees and allowing the fuse panel to drop into view. The fuse panel includes fuses 1-71.

There are also two large fuses (red 50 Amp) which provide power for the IHKA blower and secondary air pump system.

Note: Always check the proper and most current ETM when checking fuses. Due to optional equipment and production changes, some fuse numbers and locations may vary.



Located above the fuse panel, there are additional high amperage power distribution fuses (F101-F107).

This location differs from the E38/E39 in which these high amperage fuses were located under the front passenger carpet.



Fuse Card

There is also a fuse location card in the front fuse box to assist in locating various fuses.

Fuse No.	Replacement Fuse	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
Amps	Fuse	-	-	-	-	5	-	5	-	5	5	5	7.5	-	5	5		
Fuse No.	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Amps	50	50	50	15	5	5	30	-	5	20	-	30	15	30	5	25	30	30

Fuse No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Amps	-	-	-	-	-	-	-	-	5	5	5	10	5	5	7.5	5	5	5	-
Fuse No.	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
Amps	30	15	15	30	5	-	30	25	30	7.5	7.5	20	30	-	5	30	5	30	10*

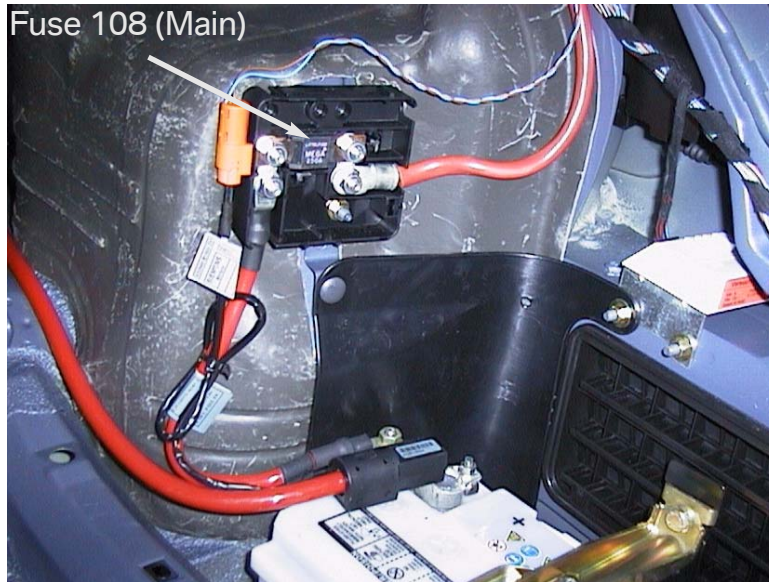
Equipment	Fuse No.	Equipment	Fuse No.
ABS, ASC	33, 53, 56	Engine control	29, 30
Adjustment driver seat	65	Folding outside mirror	57
Adjustment passenger seat	70	Front fog light	38
Airbag	11	Fuel pump	54
Air conditioner	28, 62, 63	Garage door opener	26
Auxiliary heater diesel	64	Glove box light	52
Blower	28, 37	Headlight cleaning	51
Brake light	9	Heated outside mirror, passenger	25
Central locking system	49, 60	Heated rear window	68
Central locking system rear lid	52	Heated spray nozzles	25
Cigarette lighter	47	Heater	28
Cluster clock	43	Hinged window (*only coupé)	71
Diagnosis plug	30	Horn	5, 55
DSC	33, 40, 53, 56, 61	Immobilizer	14, 67
Electric seat heating	50	Instrument cluster	10, 34, 43

Equipment	Fuse No.	Equipment	Fuse No.
Inside mirror electrochromic	24, 67	Secondary air pump	36
Interior light	49, 52	Shifting gate illumination	40
Light module	9, 32	Side airbag	11
Navigation	7, 41	Sliding/tilt roof	46
On-board computer	9	Socket	47
On-board Diagnose II	43	Speed control	9
On-board monitor	7, 41	Starter interlock	14
Outside mirror	31	Telephone	7, 39
Over heat JP	26	Theftproofing system	49, 67
Parking aid	24	Trailer coupling	44
Passenger comp./trunk lighting	52	Tyre pressure	51, 69
Radio	7, 41	Water valve, A/C	62
Rain sensor	15	Window lift front	48, 49
Reversing light	27	Window lift rear	71
Roller sun blind	12	Windowscreen washer system	49, 52, 59

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Main Fuse

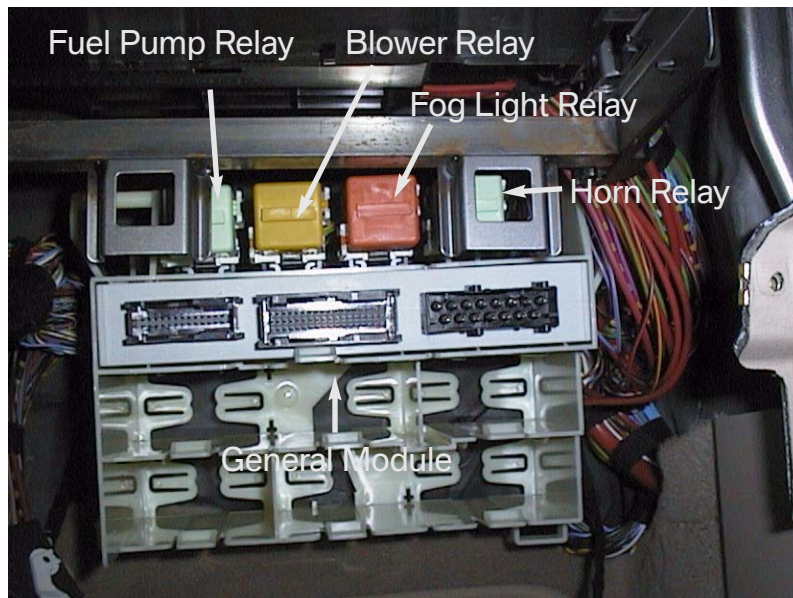
The main fuse (F108) is located on the right hand side of the trunk, near the battery. F108 is a 200 amp fuse which feeds the front power distribution box. F108 supplies fuses F101-107 as well as F35-F71.



Electronics Carrier

The electronics carrier is located behind the glove box and contains various control modules and relay. Depending upon equipment levels and options, the carrier will contain different modules.

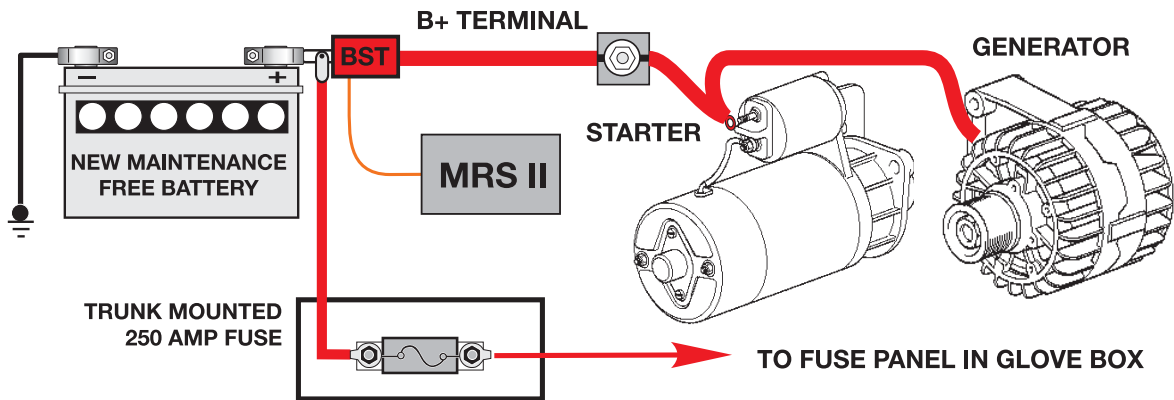
There are some modules and relays which will be present regardless of equipment. these include the General Module, fuel pump relay, horn relay, foglight relay and the blower relay for IHKA.



Battery Safety Terminal

The E46 uses a trunk mounted battery which has a (B+) battery cable that runs the length of the vehicle. In the event of an accident, this cable could become compromised and there is a possibility of short circuit to the vehicle body. In order to reduce this possibility, the BST was added.

The BST is a pyrotechnic device which will disconnect the battery during an impact of sufficient severity. Although the main battery cable will be disconnected, the connection to the power distribution circuits will remain intact to allow other vehicle features to remain operational (power windows, locks etc).

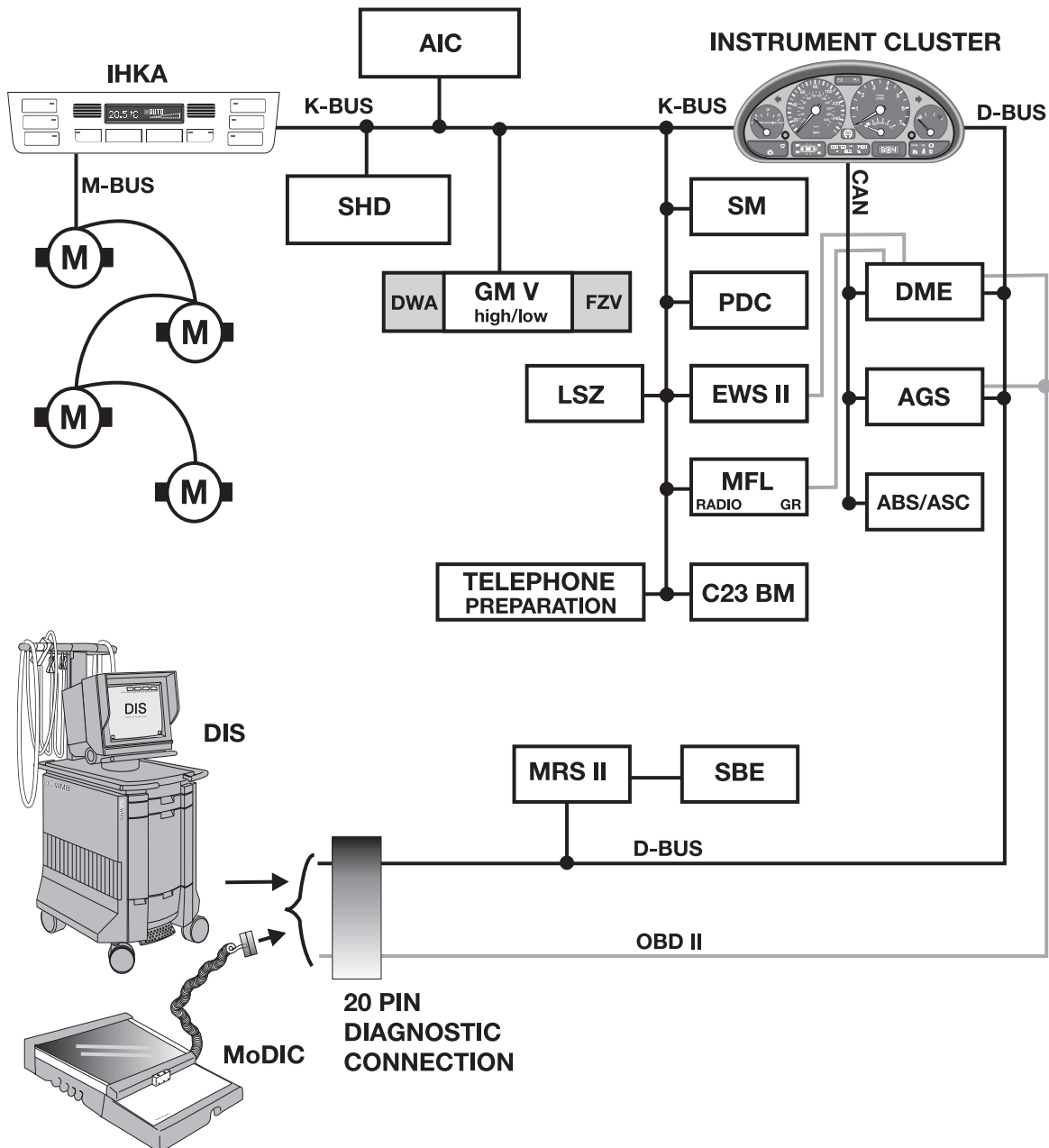


E46 Bus Systems

In comparison to the E36, the E46 was the first 3 series vehicle to make extensive use of bus networks. The E46 benefitted from the latest bus technology which was introduced previously on the E38 and E39.

The E46 bus network consists of the following busses:

- Diagnosis Bus (D-Bus)
- Controller Area Network (CAN Bus)
- Local Interconnect Network (LIN bus) (From 2003)
- M-Bus
- Body Bus (K-Bus)



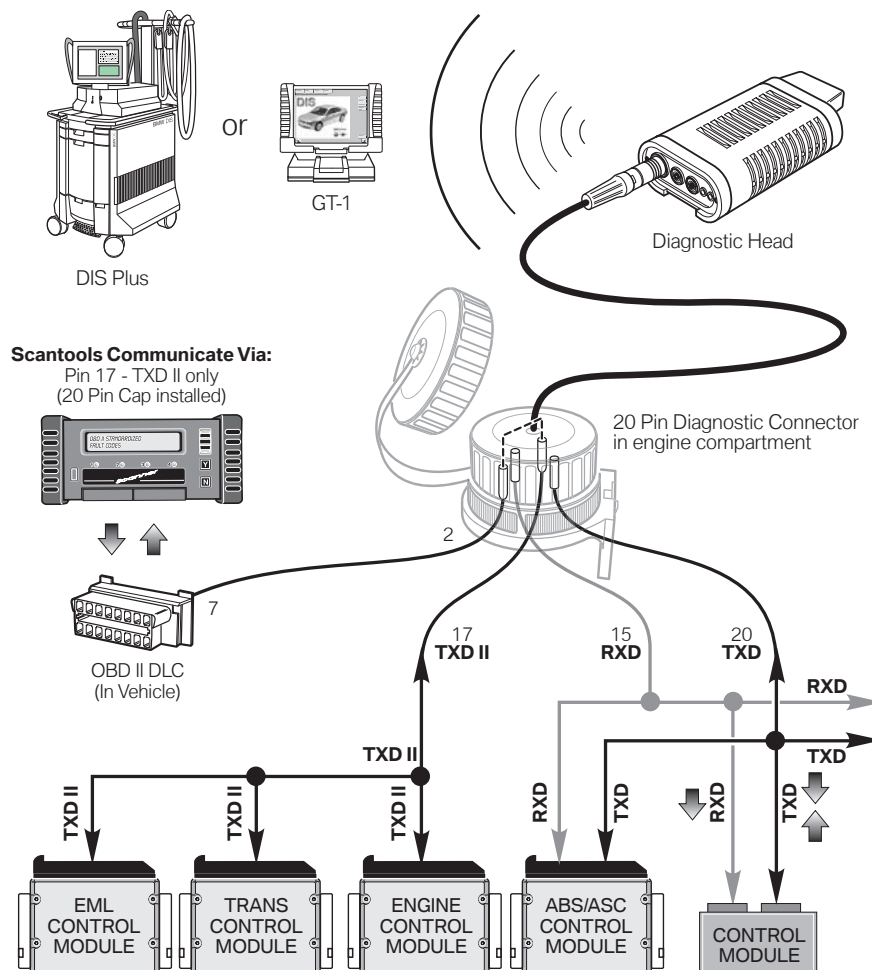
Diagnosis Bus (D-Bus)

The D-bus is used for diagnostic purposes, formerly referred to as TXD (RXD), this bus is used as an interface between the diagnostic equipment (DISPlus/Gt-1) and the various diagnoseable systems.

The D-Bus is directly connected to certain modules for diagnosis, however some modules are diagnosed via a gateway. In the E46, the instrument cluster acts as a gateway between the D-Bus, CAN bus and K-Bus. For example, in order to read out fault codes from the LSZ, the instrument cluster provides the gateway between the K-Bus and D-bus.

From start of production, the E46 was equipped with a 20-pin underhood diagnostic connection as well as the required OBD II diagnostic connector (DLC). The OBD II connector provided communication with the ECM (DME) and the EGS control modules using aftermarket diagnostic equipment. To allow this communication, TXD II was added as a dedicated connection. TXD II is identical to the D-bus, but is connected only to pin 17 of the OBD II connector and the ECM. The EGS communicates via CAN.

In model year 2001, the 20-pin diagnostic connector was deleted. BMW diagnostic equipment now communicated exclusively through the 16-pin DLC.



Body Bus (K-Bus)

The K-Bus is used for the majority of systems on the E46. It differs from the I/K structure used on the E38 and E39. The E46 does not use the I-Bus, but rather the K-Bus exclusively.

The K-bus is a single wire network throughout the vehicle. The K-bus voltage is approximately 12 volts.

Controller Area Network (CAN Bus)

The CAN bus is a two wire bus used to allow communication between powertrain related components and systems. The CAN network on the E46 uses a twisted pair configuration which also uses two terminal resistors of 120 ohms each for a total circuit resistance of 60 ohms.

M Bus

The M bus is used exclusively for the climate control system. The M bus allows the IHKA/R control module to communicate with the various stepper motors for temperature regulation and air flap control. There are 4 stepper motors used on the M-bus of the E46.

Local Interconnect Network (LIN Bus)

The LIN bus was not introduced on the E46 from start of production. The LIN bus was added to the E46 from 2003 for Adaptive Headlights (AHL) and for side view mirror control. The LIN bus consists of a single yellow/violet (GE/VI) wire.

