Car System Requirements

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Figure 1: Report Form

CHANGE LOG

Revision	Change Summary	Author	Date
-	Initial Release	Gebs Reporting	4/04/2013
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AUTHORS

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Joe Bloggs	John Doe	A N Other
01 MAR 2013	03 MAR 2013	05 MAR 2013

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Functional Requirements

Power car

Control car

Illuminate car

Control windows

Control sun roof

Maintain visibility

Stabilize occupants

Protect passengers

Protect environmental

Modularity

Control entertainment

Communicate

Calculate

Accommodate

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Power car

Move car

Move forwards

Requirement 1004: The car shall be able to move forwards at all speeds from 0 to 200 kilometers per hour on standard flat roads with winds of 0 kilometers per hour, with 180 BHP.

Move backwards

Requirement 1006: The car shall be able to move backwards to a maximum speed of 20 Kilometers per hour.

Accelerate car

Requirement 1009: The car shall be able to accelerate from 0 to 100 Kilometers per hour in 10 seconds on standard flat roads with winds of 0 kilometers per hour.

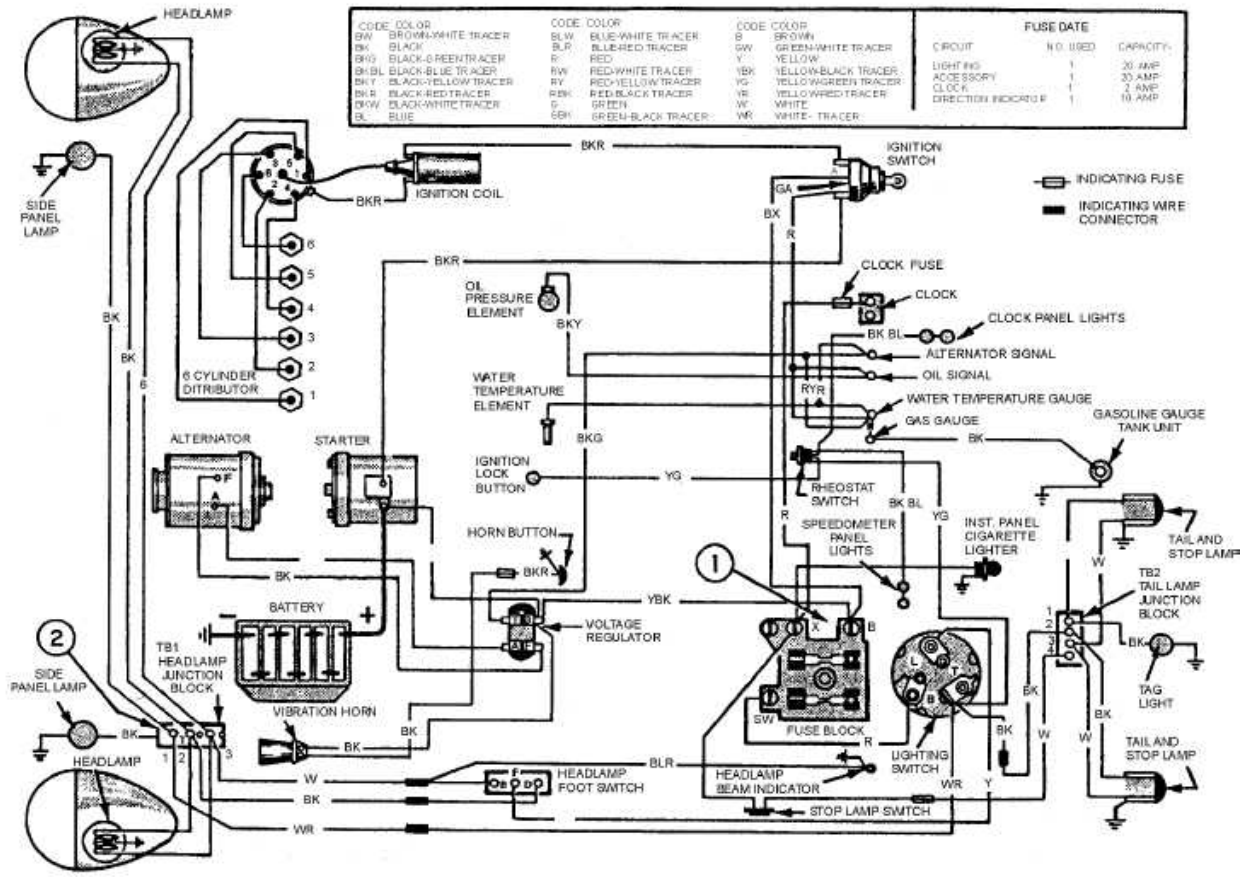

Figure 2: Car acceleration system

Requirement 1010: The car shall be able to accelerate from 100 to 150 kilometers per hour at a rate of 5 kilometers per second on standard flat roads with winds of 0 kilometers per hour.

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Requirement 1011: The car shall be able to accelerate from 150 to 200 kilometers per hour at a rate of 3 kilometers per second on standard flat roads with winds of 0 kilometers per hour.

Control car

Switch on car

Requirement 1014: The car shall be able to discriminate which authorized people shall be able to switch on and operate the car.

Control speed

Requirement 1016: The car shall have a foot mechanism to control the speed of the car.

Requirement 1017: The speed control shall be infinitely variable from zero to maximum speed.

Requirement 1018: The speed of the car shall be controllable by automatic means.

Brake car

Requirement 1020: The car shall be able to stop from 10 kilometers per hour to 0 kph in 2 seconds.

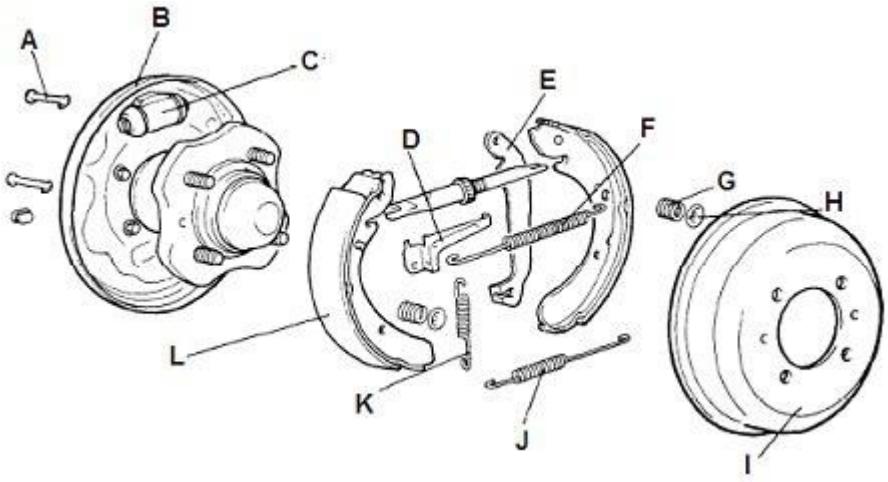

Figure 3: Brake system

Requirement 1021: The car shall be able to stop from 30 kilometers per hour to 0 kph in 6 seconds.

Requirement 1022: The car shall be able to stop from 100 kilometers per hour to 0 kph in 30 seconds.

Requirement 1023: The car shall be able to stop from 200 kilometers per hour to 0 kph in 45 seconds.

Control direction

Straight line

Requirement 1026: The car shall have a mechanism to enable it to be moved forwards or backwards.

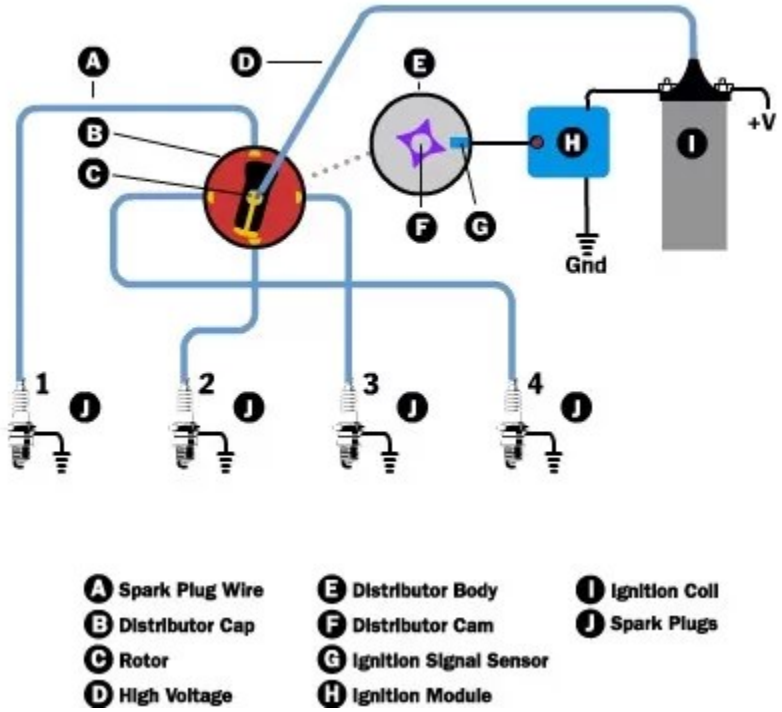

Figure 4: Control direction - components diagram

Direction mechanism

Requirement 1028: The direction control mechanism shall be hand operated and require no more than 2 inches of hand movement from the steering wheel for successful operation.

Directional

Requirement 1030: The car shall be controllable in any direction.

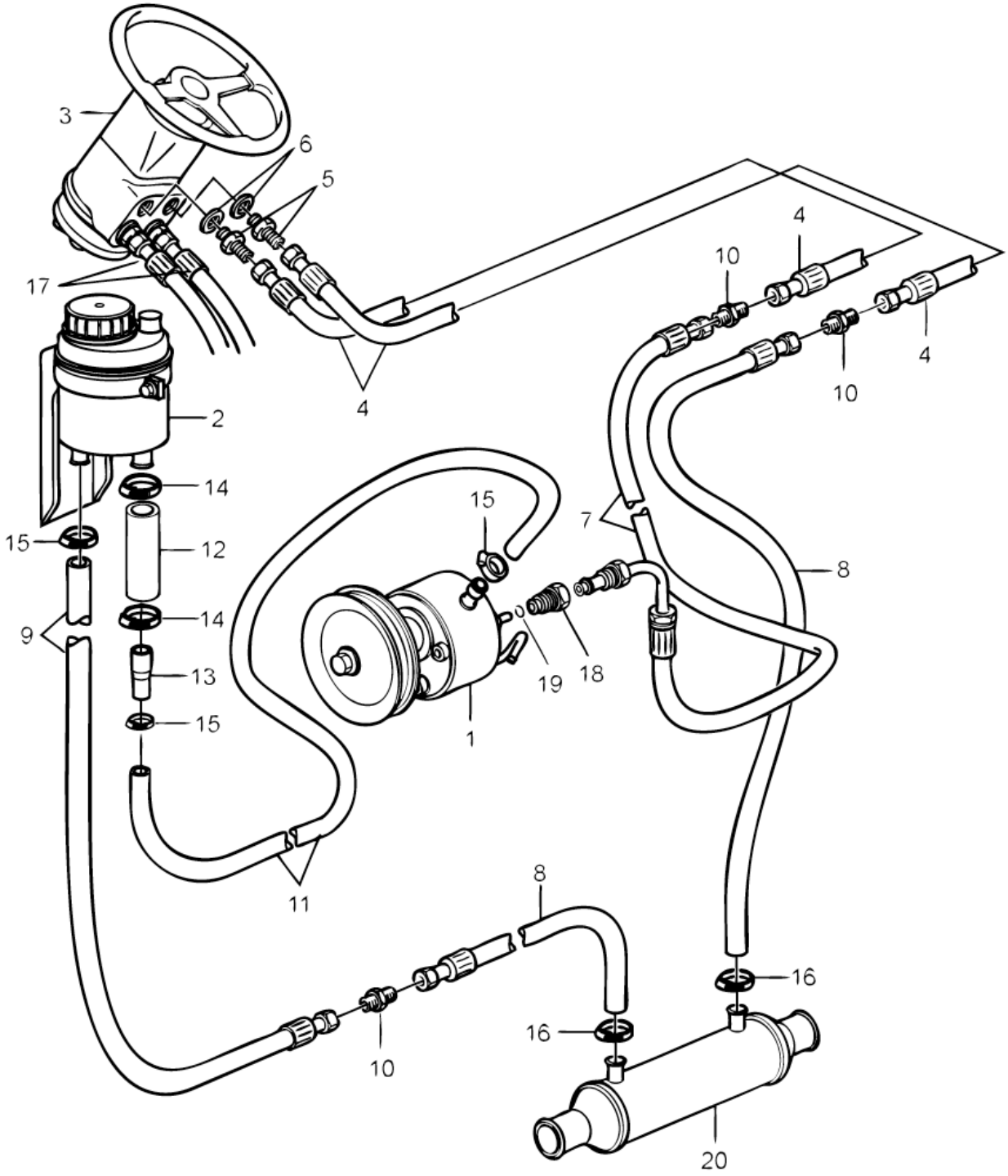

Figure 5: Directional System

Illuminate car

Illuminate external

Illuminate ahead

Headlights

Requirement 1035: Headlights shall be fitted in accordance with statutory regulations abc dated 1 Jan 1993.

Requirement 1036: Headlight beam patterns shall be in accordance with statutory regulations abc dated 1 Jan 1993.

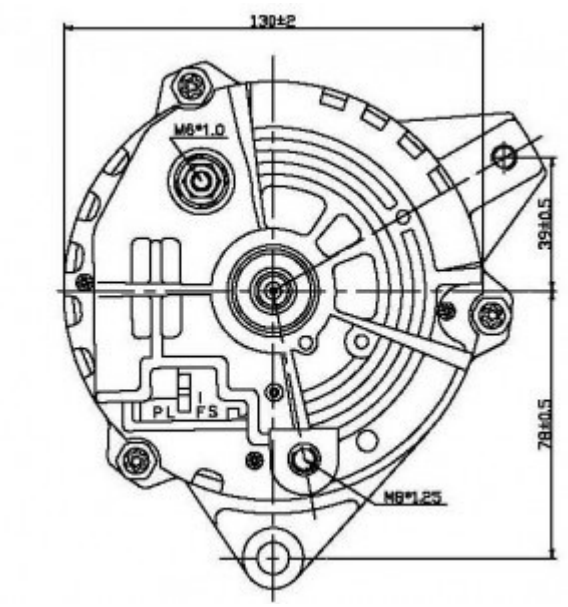

Figure 6: PL/FS system - ISO 26262

Side lights

Requirement 1038: Side lights shall be fitted in accordance with statutory regulations abc dated 1 Jan 1993.

Illuminate behind

Tail lights

Requirement 1041: Tail lights shall be fitted in accordance with statutory regulations abc dated 1 Jan 1993.

Reversing lights

Requirement 1043: Reversing lights shall be fitted in accordance with statutory regulations abc dated 1 Jan 1993.

Illuminate in adverse weather conditions

Requirement 1045: Fog lights shall switch on automatically in adverse weather conditions

Warn of braking

Requirement 1047: Brake lights shall be fitted in accordance with statutory regulations abc dated 1 Jan 1993.

Warn of turning

Requirement 1049: Indicator lights shall be fitted in accordance with statutory regulations abc dated 1 Jan 1993.

Switch on lights

Requirement 1051: All lights shall be able to be switched on without the need for the driver moving either of his hands more the 2.2 cms from the steering wheel.

Control windows

Requirement 1053: All windows shall be able to be opened and closed by automatic means by the user.

Control sun roof

Requirement 1055: A sun roof shall be able to be opened and closed by automatic means by the user.

Maintain visibility

Requirement 1057: Maximum visibility shall be maintained automatically.

Stabilize occupants

Requirement 1059: The car shall be able to maintain stability of travel with maximum tilt from vertical of the car being no greater than 4 degrees for the speed/ turning circle curves at reference xyz.

Protect passengers

Protect passively

Requirement 1062: The car shall be able to protect passengers passively in the event of an accident.

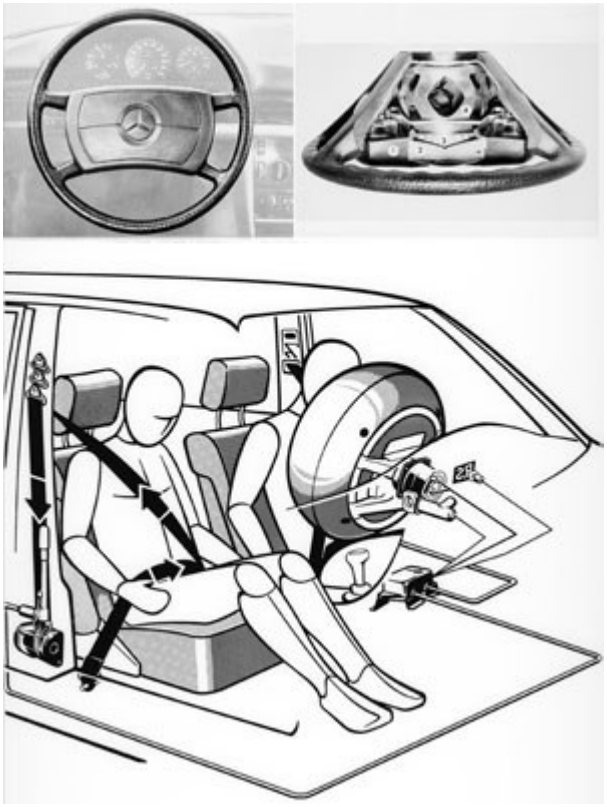

Figure 7: Airbag system - 6+1

Protect actively

Requirement 1064: The car shall be able to protect passengers actively in the event of an accident.

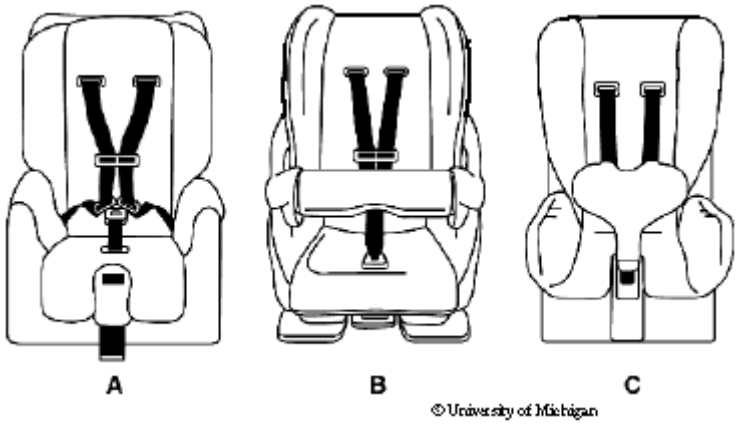

Figure 8: Safty system - 3 points belt

Protect environmental

Control emission

Requirement 1067: The car shall meet the necessary emission controls for each country in which it will be used.

Control disposal

Requirement 1069: The vehicle shall meet the environmental conditions as agreed in the European treaty dated 1 Jan 1993 for the disposal of used cars.

Modularity

Requirement 1071: The vehicle shall be as modular as possible.

Requirement 1072: The vehicle shall be assembled from pre-assembled parts with 24 hours of labor.

Control entertainment

Control radio

Requirement 1075: The system shall enable the user to control radio reception.

Control CD

Requirement 1077: The system shall enable the user to control the CD player.

Control tape player

Requirement 1079: The system shall enable the user to control the tape player.

Communicate

Requirement 1081: The car shall transmit and receive voice communication by a standard commercial telephone system.

Calculate

Calculate fuel consumption

Calculate fuel consumption

Requirement 1085: The system shall be able to calculate the current fuel consumption.

Calculate fuel consumption

Requirement 1087: The system shall be able to calculate the fuel consumption for a specified journey as defined by the user.

Calculate remaining fuel

Requirement 1090: The system shall be able to calculate the fuel remaining for guaranteed travel with zero risk running out of fuel.

Calculate running costs

Requirement 1092: The system shall be able to calculate the current running costs for the car from data input by the user.

Calculate direction-to-go

Requirement 1094: The system shall be able to calculate the next turning for a route specified by the user.

Calculate miles-to-go

Requirement 1269: The system shall be able to calculate the number of miles-to-go on any route specified by the user.

Calculate time-to-go

Requirement 1270: The system shall be able to calculate the time remaining to complete a journey specified by the user.

Calculate journey length

Requirement 1098: The system shall be able to calculate the length of any journey as specified by the user.

Display route map

Requirement 1100: The system shall be able to display a route map of any journey specified by the user.

Accommodate

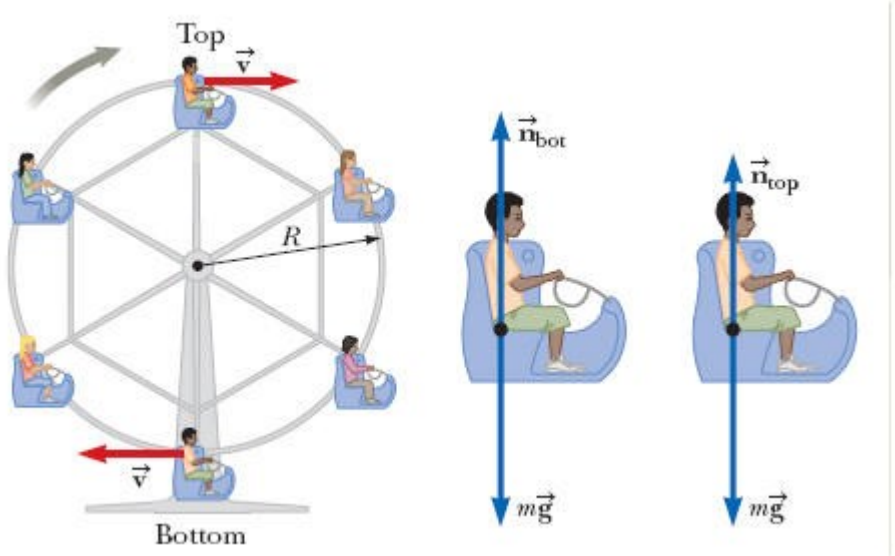

Figure 9: Accommodate

Accommodate Occupants

Requirement 1103: The car shall be able to carry 4 average size adults in average comfort for a period of 3 hours.

Accommodate Luggage

Requirement 1105: The car shall be able to carry 200 kilograms of luggage.

Accommodate Fuel and fuel system

Requirement 1107: The car shall be able to accommodate the fuel.

Requirement 1108: The car shall be able to accommodate the fuel delivery system.

Accommodate Power unit

Requirement 1110: The car shall be powered by a petrol engine if research proves this to be economical.

Requirement 1111: The car shall be powered by an electric engine if research proves this to be possible.

Accommodate Steering system

Requirement 1113: The car shall be able to accommodate the steering system.

Accommodate Braking system

Requirement 1115: The car shall be able to accommodate the braking system.

Accommodate Lighting system

External

Requirement 1118: The car shall be able to accommodate the external lighting system.

Internal

Requirement 1120: The car shall be able to accommodate the internal lighting system

Accommodate Telephone system

Requirement 1122: The car shall be able to accommodate the portable telephone system.

Accommodate entertainment system

Requirement 1124: The car shall be able to accommodate the entertainment system.

Accommodate drive system

Requirement 1271: The car shall be able to accommodate the power drive system.

Accommodate accessories

Requirement 1127: The car shall accommodate the following accessories Number plates, Tax discs, warning triangle, first aid kit, emergency tools, engine identification.

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System constraints

Reliability

Requirement 1130: The car shall have a reliability of 99.99% during operation.

Modularity

Requirement 1132: The car shall be assembled from modules by 1 person in 1 working day.

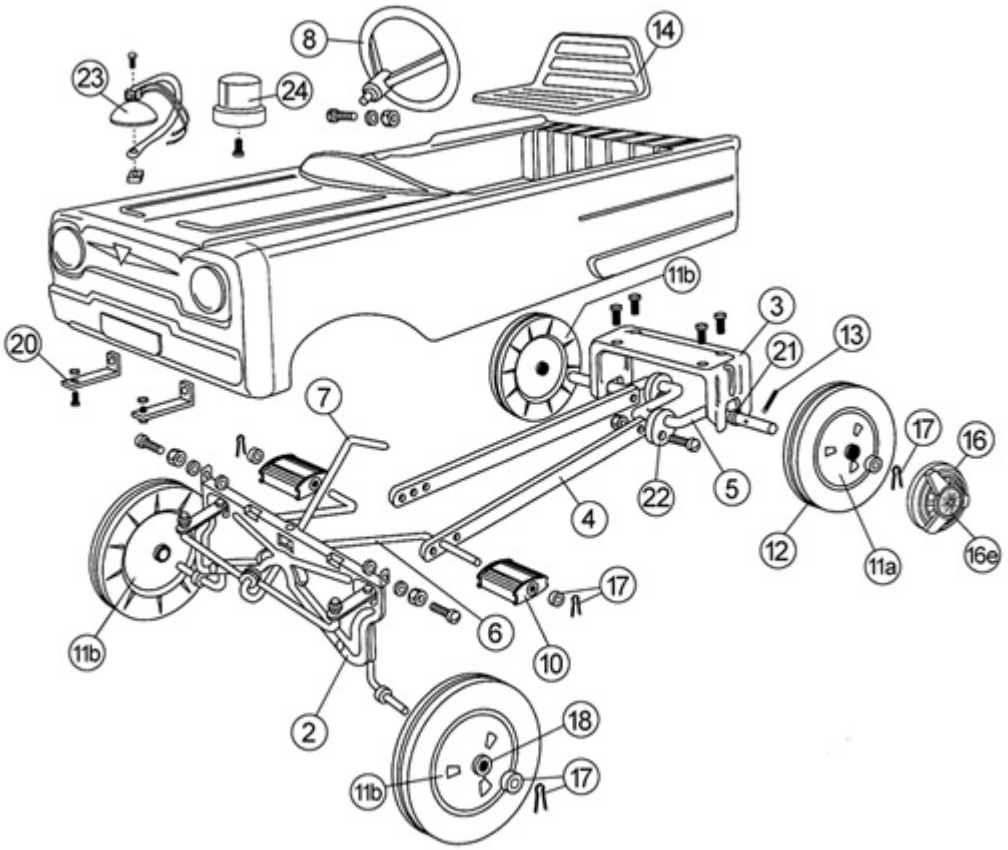

Figure 10: Car modules

Failure modes

Requirement 1134: To be defined.

Fuel efficiency

Requirement 1136: The car shall be able to travel at 80 kph with a passenger load of 90 kilograms and luggage of 0 kilograms on standard flat roads with a wind speed of 0 kph at a maximum fuel cost of 1.0 pence per kilometer at prices of 1 January 1994.

Requirement 1137: The car shall be able to travel at up to 200 kph with a passenger load of up to 260 kilograms and luggage of up to 200 kilograms on standard flat roads with a wind speed of 0 kph at a maximum fuel cost of 4 pence per kilometer at prices of 1 January 1994.

Fuel input mechanism

Requirement 1272: The car shall be compatible with all standard fuel supply mechanisms in the countries to which it will be sold.

Braking

Requirement 1140: The car shall be fitted with ABS.

Steer car

Requirement 1142: The car shall have a minimum turning circle of 3 meters.