TITLE: Electro Mechatronics in Cars

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The authors gratefully acknowledge the support provided by Ing. Ľudovít Kerner and MUDr. Marta Kernerová for the publication of this monograph. Their selfless assistance has significantly contributed to the dissemination of research results and new knowledge in the field of automotive electromechatronics.

PRINTING

YEAR: 2026

EDITION: first

PUBLICATION TYPE: Monograph

PICTURES: Anesh Issayeva

NUMBER OF COPIES: 200

NUMBER OF PAGES: 212

Publisher:
RAM-Verlag
Stüttinghauser Ringstr. 44
D-58515 Lüdenscheid
Germany
RAM-Verlag@t-online.de
https://ram-verlag.eu

The publisher cannot be held responsible for any linguistic errors in books:
Such responsibility is only up to the authors.
This publication has not been subjected to professional English language proofreading.

ISBN 978-3-96595-059-7

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Introduction

Today, electrical engineering in passenger cars accounts for up to 30% of their production price. For commercial vehicles, it is up to 20% of the price of the vehicle. In the future, the share is expected to increase to 50% for passenger cars and 30% for commercial vehicles. With the development of electronics, the share of electrical engineering is growing, and in the case of electric cars it is already more than 50% of the price of the vehicle. Originally, electricity was mostly used only for lighting and signalling. It has undergone enormous development and nowadays has a significant influence on the management of processes in the car itself and processes of interaction with the environment. Electronics in motoring are of growing importance in terms of safety in road traffic, they significantly increase driver comfort and, last but not least, ensure the greening of vehicle use by more perfect control of fuel processing processes and the conversion of exhalates into less harmful compounds. A significant contribution of electronics is the supervision and warning of various dangerous and collision situations, or the direct prevention of such situations in road traffic. An important function provided by electronics is the post-crisis solution to dangerous situations, either by preventing damage to the life, health and property of the persons involved, or by informing the emergency services about the crisis that has arisen. Electronics play a significant role in preventing unauthorized handling of the vehicle or its parts.

That is why it is very important to develop this field and devote yourself to it at universities, where the textbook is mainly intended.

The source of electricity in vehicles is a generator. It also supplies energy to the battery and thus charges it. In the idle state, the battery then serves as an energy store. The table (Tab. 1) shows the average power values of appliances.

The power of long-connected appliances ranges from 169 W to 266 W. The power of short-term appliances, if other small drives are considered, will range from 1960 W to 4270 W.

Tab. 1 Average appliance performance values

Resources	During operation	→ Charging	At rest
	Generator as a source of energy		Battery as an energy store
Appliances			
	Always connected appliances	Long-term connected appliances	Short-term connected appliances
	Ignition 20 W	Radio 10 up to 15 W	Direction indicator lamps 21 W
	Fuel pump 50 up to 70 W	Parking lamps 4 W	Fog lamps 35 up to 55 W
	Electric injection 70 up to 100 W	Instrument lighting 2 until 10 W	Brake lights 18 up to 21 W
	Lighting VRP 10 W	Reversing lamps 21 until 55 W	
	Parking lights 3 up to 5 W	Interior lamp 5 W	
		Dipped-beam headlamps 55 W	Wiper drive 60 until 90 W
		Main-beam headlamps 60 up to 90 W	Electric windows 150 W
	Tail lighting 5 W	Starter 800 up to 3000 W	
	Car heating 20 up to 60 W	Radiator fan 200 W	
	Washer 60 W		
	Heating fan 80 W		
	Cigarette lighter 100 W		
	Heated rear window 120 W		
	Additional washer 55 W		
	Rear wiper drive 30 up to 65 W		
	Additional brake lights 21 W		
	Horn 25 up to 40 W		
			Diesel engine glow 100 W
	Together 140 up to 190 W	Together 169 up to 266 W	Together 1960 up to 4270 W