



<b>2 Basics of mechatronics</b>	165 Overview of the physical effects for sensors
2 Mechatronic systems and components	167 Overview and selection of sensor technologies
4 Development methods	
6 Outlook	
<b>8 Architecture</b>	<b>168 Sensor measuring principles</b>
8 Overview	168 Position sensors
11 Vehicle system architecture	195 Speed and rpm sensors
<b>18 Electronic control unit</b>	207 Acceleration sensors
18 Operating conditions	212 Pressure sensors
18 Design	215 Force and torque sensors
18 Data processing	224 Flowmeters
22 Digital modules in the control unit	230 Gas sensors and concentration sensors
26 Control unit software	234 Temperature sensors
30 Software Development	244 Imaging sensors (video)
<b>44 Basic principles of networking</b>	<b>246 Sensor types</b>
44 Network topology	246 Engine-speed sensors
48 Network organization	248 Hall phase sensors
50 OSI reference model	249 Speed sensors for transmission control
52 Control mechanisms	252 Wheel-speed sensors
<b>56 Automotive networking</b>	256 Micromechanical yaw-rate sensors
56 Cross-system functions	259 Piezoelectric “tuning-fork” yaw-rate sensor
57 Requirements for bus systems	260 Micromechanical pressure sensors
59 Classification of bus systems	262 High-pressure sensors
59 Applications in the vehicle	263 Temperature sensors
61 Coupling of networks	264 Accelerator-pedal sensors
61 Examples of networked vehicles	266 Steering-angle sensors
<b>70 Bus systems</b>	268 Position sensors for transmission control
70 CAN bus	271 Axle sensors
84 LIN bus	272 Hot-film air-mass meters
90 Bluetooth	275 Piezoelectric knock sensors
100 MOST bus	276 SMM acceleration sensors
111 TTP/C	278 Micromechanical bulk silicon acceleration sensors
124 FlexRay	279 Piezoelectric acceleration sensors
136 Diagnosis interfaces	280 iBolt™ force sensor
<b>144 Automotive sensors</b>	282 Torque sensor
144 Basics and overview	283 Rain/light sensor
147 Automotive applications	284 Two-step Lambda oxygen sensors
150 Details of the sensor market	288 LSU4 planar wide-band lambda oxygen sensor
151 Features of vehicle sensors	
152 Sensor classification	<b>290 Electric Actuators</b>
154 Error types and tolerance requirements	290 Electromechanical actuators
155 Reliability	295 Fluid-mechanical actuators
158 Main requirements, trends	296 Electrical machines
	<b>302 Electrohydraulic Actuators</b>
	302 Application and Function

302	Requirements	<b>404 Hydraulic modulator</b>
303	Design and Operating Concept	404 Development history
304	Actuator Types	405 Design
313	Simulations in Development	408 Pressure modulation
<b>316 Electronic Transmission Control</b>		<b>412 Sensotronic brake control (SBC)</b>
316	Drivetrain Management	412 Purpose and function
317	Market Trends	414 Design
318	Control of Automated Shift Transmission AST	414 Method of operation
322	Control of Automatic Transmissions	<b>416 Overview of common-rail systems</b>
338	Control of Continuously Variable Transmission	416 Areas of application
340	ECUs for Electronic Transmission Control	417 Design
347	Thermo-Management	418 Operating concept
349	Processes and Tools Used in ECU Development	422 Common-rail system for passenger cars
		427 Common-rail system for commercial vehicles
<b>350 Modules for Transmission Control</b>		<b>430 High-pressure components of common-rail system</b>
350	Application	430 Overview
351	Module Types	432 Injector
<b>354 Antilock Braking System (ABS)</b>		444 High-pressure pumps
354	System overview	450 Fuel rail (high-pressure accumulator)
356	Requirements placed on ABS	451 High-pressure sensors
357	Dynamics of a braked wheel	452 Pressure-control valve
358	ABS control loop	453 Pressure-relief valve
362	Typical control cycles	<b>454 Electronic Diesel Control (EDC)</b>
<b>370 Traction Control System (TCS)</b>		454 System overview
370	Tasks	456 Common-rail system for passenger cars
370	Function description	457 Common-rail system for commercial vehicles
372	Structure of traction control system (TCS)	458 Data processing
373	Typical control situations	460 Fuel-injection control
374	Traction control system (TCS) for four wheel drive vehicles	468 Lambda closed-loop control for passenger-car diesel engines
<b>378 Electronic Stability Program (ESP)</b>		473 Torque-controlled EDC systems
378	Requirements	476 Data exchange with other systems
379	Tasks and method of operation	477 Serial data transmission (CAN)
380	Maneuvers	<b>478 Active steering</b>
388	Closed-loop control system and controlled variables	478 Purpose
<b>394 Automatic brake functions</b>		478 Design
394	Overview	480 Method of operation
396	Standard function	481 Safety concept
398	Additional functions	481 Benefits of active steering for the driver

<b>482 Drive and adjustment systems</b>	<b>496 Electromagnetic compatibility (EMC) and interference suppression</b>
482 Power windows	496 EMC ranges
483 Power sunroofs	497 EMC between different systems in the vehicle
484 Seat and steering column adjustment	504 EMC between the vehicle and its surroundings
<b>485 Heating, ventilation and air conditioning</b>	508 Guarantee of immunity and interference suppression
485 Electronic heater control	
485 Electronically controlled air conditioning system	
<b>488 Vehicle security systems</b>	<b>510 Fault diagnostics</b>
488 Acoustic signaling devices	510 Monitoring during vehicle operation (on-board diagnosis)
489 Central locking system	513 On-board diagnosis system for passenger cars and light-duty trucks
490 Locking systems	520 On-board diagnosis system for heavy-duty trucks
494 Biometric systems	

<http://www.springer.com/978-3-658-03974-5>

Automotive Mechatronics

Automotive Networking, Driving Stability Systems,  
Electronics

Reif, K. (Ed.)

2015, X, 538 p. 657 illus., Softcover

ISBN: 978-3-658-03974-5