

Contents

General technical knowledge

Quantities and units	6
Conversion tables	13
Tolerances	37

Mathematics

Mathematical signs, symbols	42
Trigonometric functions, units	44
Volumes and surface areas	48
EDV	60
Control engineering	64

Physics

Mechanics	68
Vibration and oscillation	76
Acoustics	79
Heat	85
Strength of materials	88
Technical optics	96
Electrical engineering	102
Electric machines	118
Electronics	122

Materials science

Chemical elements	132
Terminology and parameters	132
Material groups	138
Material properties (Tables)	142
Hardness	179
Heat treatment	184
Corrosion/corrosion protection	189
Chemicals (Tables)	198
Lubricants	204
Fuels	210

Machine elements

Sliding and rolling bearings	218
Spring calculations	228
Screwed fasteners	232
Threads	239
Gears and gear teeth	242
Belt drives	252

Motor-vehicle dynamics

Vehicle longitudinal dynamics	256
Vehicle transverse dynamics	270
Driving dynamics, comm. vehicles	275
Agricultural tractors, req'ments	278

Vehicle drives

Street vehicle requirements	280
Internal combustion engines	282
Principle of operation, classic'n	282
Reciprocating-piston engine with internal combustion	285
Spark-ignition (SI) engine	288
Diesel engine	292
Hybrid process	297
Gas exchange	298

Supercharging	301
Power transmission, reciprocating-piston engine	304
Balancing of masses	309
Main components, reciprocating-piston engine	314
Cooling and lubrication circuit	320
Wankel rotary engine	322
Gas turbines	324
Recip-piston engine with external combustion (Stirling engine)	326
Empirical values and data for calculation	328
Hydrostatic drives	340
Electric drives	342
Hybrid drives	346
Cooling	
Cooling equipment	349
Cooling, charge-air/lube oil	351
Air supply	
Air filters	352
Superchargers	354
Fuel Metering	
Fuel management	360
Carburetors	361
Gasoline injection	366
K-Jetronic	366
KE-Jetronic	368
L-Jetronic	370
LH-Jetronic	372
Mono-Jetronic	374
Idle-speed control	376
Jetronic test eqpt./technology	377
LPG installations	378
Fuel metering, Diesel engines	380
In-line injection pumps (PE)	382
Distributor injection pumps (VE)	388
Nozzles, injection	391
Injection-pump test benches	393
Starting and ignition systems	
Auxiliary starting devices	394
Ignition	396
Battery ignition	399
Coil ignition (CI)	399
Transistorized ignition (TCI)	402
Capacitor-discharge ignition (CDI)	404
Electronic ignition (ESA)	405
Distributorless ignition (DLI)	407
Knock control (KC)	408
Spark plugs	410
Motronic; combined ignition and fuel-injection system	414
Electrical energy supply	418
Starter batteries	423
Battery chargers	426

Traction batteries	427
Alternators	428
Starting systems	434
Exhaust gases emitted by IC engines	
Products of combustion	438
Emission control in SI engines	439
Lambda closed-loop control	442
Exhaust-gas tests, SI engines	443
Emission control, Diesel engines	448
Exhaust-gas tests, Diesel engines	450
Exhaust systems	454
Power transmission	
Power train	456
Clutches	458
Transmissions	461
Final drives	471
Differentials	473
Four-wheel drive, transfer box	474
Traction control (ASR)	475
Undercarriage, chassis	
Suspension	476
Wheel suspension	481
Wheel brakes	485
Wheels	488
Tires	492
Steering	498
Braking equipment	
Legal regulations	502
Definitions, principles	502
Classification, design, application	507
Braking equipment for commercial vehicles	510
Braking equipment for pass. cars and light commercial vehicles	524
Brake analyzers	536
Road-vehicle systematics	538
Vehicle bodies, passenger cars	
Main dimensions	540
Body structure	544
Body materials	545
Body surface	546
Safety	548
Calculation	552
Vehicle bodies, commercial vehicles	
Commercial vehicles	554
Light-duty trucks	554
Medium and heavy-duty trucks and tractor vehicles	554
Buses	557
Safety	558
Noise reduction in commercial vehicles	559
Symbols used in motor-vehicle electrical systems	
Symbols	560
Identification, electrical devices	563
Terminal designations	564
Circuit diagram	568
Wiring diagram	571
Conductor calculations	574
Lighting	
Specifications	576
Headlamps	578
Lamps	588
Incandescent bulbs	593
Headlight aiming devices	595
Signaling and alarm systems	
Visual signaling systems	596
Acoustic signaling devices	597
Anti-theft alarm systems	598
Vehicle windows and window cleaning	
Motor-vehicle glass windows	600
Window and headlamp cleaning	602
Heating and air-conditioning	
Engine-dependent heating system	606
Air-conditioning systems	607
Engine-independent heating system	609
Communication and information systems	
Car radio	610
Interference-suppression	613
Electromagn. compatibility (EMC)	618
Check-Control	622
Trip computer	623
Trip recorder	624
Comfort and safety systems	
Electromechan. seat adjustment	626
Electromechanical sunroof drives	626
Electromechanical window drives	627
Passenger-restraint systems	628
Vehicle hydraulics	
Basics	630
Pumps, motors	632
Valves	634
Hydraulic accumulators, cylinders	638
Auxiliary drives	639
Agricultural tractor hydraulics	641
Vehicle pneumatics	
Door operation	644
Radiator louvers	645
Environmental effects, veh. eqpt.	646
Motor vehicle specifications	
Specifications, German and foreign passenger cars (selection)	648
Road-traffic legislation	678
Miscellaneous	
Alphabets and numbers	685
Index of headings	686