

## Contents

<b>00 - Technical data</b>	<b>1</b>
<b>1 Safety information</b>	<b>1</b>
1.1 Safety precautions when working on air conditioners	1
1.2 Safety precautions when handling refrigerants	1
1.3 Safety precautions when working on vehicles with high-voltage system	2
1.4 Safety precautions when working in the vicinity of high-voltage components	3
1.5 Safety precautions when working on vehicles with start/stop system	3
1.6 Safety precautions when using testers and measuring instruments during a road test	3
1.7 Safety precautions when working on the cooling system	4
1.8 Safety precautions when working on vehicles with auxiliary/supplementary heater	4
<b>2 Identification</b>	<b>6</b>
2.1 Identification of heater and air conditioning unit	6
<b>3 General notes</b>	<b>8</b>
3.1 Type plates	8
3.2 Notes on odours in vehicles with air conditioner	9
<b>4 Repair instructions</b>	<b>10</b>
4.1 Rules for cleanliness	10
4.2 General notes	10
4.3 Contact corrosion	11
4.4 Routing and attachment of pipes, hoses and wiring	11
4.5 Installing radiators and condensers	11
4.6 Checking heating output	11
4.7 Checking cooling output	12
4.8 Checking air conditioning system functions - vehicles with high-voltage system	12
4.9 Working on refrigerant circuit	13
4.10 Paintwork repairs on vehicles with air conditioning system	13
4.11 Refrigerant circuit seals	13
4.12 Notes on high-voltage components and potential equalisation lines	14
4.13 Use of impact wrenches	14
4.14 Identification plates	15
<b>5 Technical data</b>	<b>16</b>
5.1 Refrigerant capacities	16
5.2 Approved refrigerant oils and refrigerant oil capacities	17
5.3 Oil distribution	21
<b>80 - Heating</b>	<b>22</b>
<b>1 Safety information</b>	<b>22</b>
<b>2 Overview of fitting locations - heater</b>	<b>23</b>
<b>87 - Air conditioning system</b>	<b>24</b>
<b>1 Safety information</b>	<b>24</b>
<b>2 Overview of fitting locations - air conditioner</b>	<b>25</b>
2.1 Overview of fitting locations - components not located in passenger compartment	25
2.2 Overview of fitting locations - components in front passenger compartment	29
2.3 Overview of fitting locations - components in rear passenger compartment	31
<b>3 Refrigerant circuit</b>	<b>34</b>
3.1 System overview - refrigerant circuit	34
3.2 Assembly overview - refrigerant lines	42
3.3 Assembly overview - condenser	66
3.4 Assembly overview - heat exchanger for high-voltage battery	68
3.5 Assembly overview - heat exchanger for heat pump operation	70
3.6 Removing and installing high-pressure sender G65	70

3.7	Removing and installing refrigerant pressure and temperature sender G395	73
3.8	Removing and installing refrigerant pressure and temperature sender 2 G826	76
3.9	Removing and installing heat exchanger for heat pump operation with refrigerant receiver	79
3.10	Removing and installing refrigerant receiver	82
3.11	Removing and installing heat exchanger for high-voltage battery	86
3.12	Removing and installing refrigerant lines with internal heat exchanger	90
3.13	Removing and installing refrigerant lines in plenum chamber	96
3.14	Removing and installing refrigerant shut-off valve V424	101
3.15	Removing and installing expansion valve	104
3.16	Removing and installing non-return valves in refrigerant circuit	108
3.17	Unfastening and assembling connection points in refrigerant lines	117
3.18	Removing and installing condenser	119
3.19	Detaching and attaching refrigerant lines at condenser	126
3.20	Removing and installing desiccant bag/desiccant cartridge	135
3.21	Removing and installing evacuating and charging valve (low-pressure and high-pressure sides)	139
3.22	Starting up air conditioner after charging refrigerant circuit	142
3.23	Cleaning air conditioner refrigerant circuit - vehicles with high-voltage system	144
<b>4</b>	<b>Heat pump valve unit</b>	<b>163</b>
4.1	Assembly overview - heat pump valve unit	163
4.2	Removing and installing bracket with heat pump valve unit	166
4.3	Removing and installing heat pump valve unit	177
4.4	Dismantling and assembling heat pump valve unit	181
4.5	Removing and installing refrigerant expansion valve 2 N637	184
<b>5</b>	<b>Air conditioner compressor</b>	<b>190</b>
5.1	Assembly overview - air conditioner compressor	190
5.2	Assembly overview - pulley	196
5.3	Detaching and attaching air conditioner compressor at bracket	206
5.4	Detaching and attaching refrigerant lines at air conditioner compressor	217
5.5	Removing and installing air conditioner compressor	226
5.6	Preparations for renewing pulley	248
5.7	Removing and installing pulley (without magnetic clutch)	248
5.8	Removing and installing pulley with air conditioning system magnetic clutch N25	253
<b>6</b>	<b>Control motors</b>	<b>259</b>
6.1	Overview of fitting locations - front control motors	259
6.2	Assembly overview - front control motors	262
6.3	Assembly overview - rear control motors	277
6.4	General information and procedure for removing and installing control motors	278
6.5	Removing and installing fresh air flap control motor V438	280
6.6	Removing and installing defroster flap control motor V107	282
6.7	Removing and installing left footwell flap control motor V108	285
6.8	Removing and installing right footwell flap control motor V109	287
6.9	Removing and installing left centre vent control motor V110	289
6.10	Removing and installing right centre vent control motor V111	295
6.11	Removing and installing air recirculation flap control motor V113	299
6.12	Removing and installing rear temperature flap control motor V137/rear left air quantity flap control motor V239	301
6.13	Removing and installing left temperature flap control motor V158	303
6.14	Removing and installing right temperature flap control motor V159	306
6.15	Removing and installing right B-pillar and footwell shut-off flap control motor V211/left B-pillar and footwell shut-off flap control motor V212	308
6.16	Removing and installing left side vent control motor V299 - vehicles with PR number 9AQ	309
6.17	Removing and installing right side vent control motor V300 - vehicles with PR number 9AQ	312
6.18	Removing and installing rear air distribution flap control motor V427/rear right air distribution control motor V594	314

6.19	Removing and installing rear left air distribution control motor V593	316
6.20	Removing and installing rear right air quantity flap control motor V240	318
6.21	Removing and installing brackets for control motors on front heater and air conditioning unit	320
<b>7</b>	<b>Front heater and air conditioning unit</b>	<b>335</b>
7.1	Assembly overview - heater and air conditioning unit	335
7.2	Assembly overview - attachments for front heater and air conditioning unit (air distribution housing, heat exchanger etc.)	336
7.3	Assembly overview - air intake box of heater and air conditioning unit	338
7.4	Assembly overview - evaporator housing	340
7.5	Removing and installing evaporator	342
7.6	Removing and installing auxiliary air heater element Z35	345
7.7	Removing and installing heater and air conditioning unit	350
7.8	Detaching and attaching air intake box at heater and air conditioning unit	355
7.9	Removing and installing dust and pollen filter	356
7.10	Removing and installing fresh air blower V2 with fresh air blower control unit J126	358
7.11	Removing and installing heat exchanger	360
7.12	Removing and installing condensation drain	369
7.13	Checking condensation drain	371
<b>8</b>	<b>Air duct</b>	<b>372</b>
8.1	Assembly overview - routing of air flow and air distribution in passenger compartment	372
8.2	Air intake and air outlet openings	376
8.3	Assembly overview - fresh air intake	380
8.4	Removing and installing air duct for centre dash panel vent	383
8.5	Removing and installing footwell vent (driver side)	383
8.6	Removing and installing footwell vent (front passenger side)	384
8.7	Removing and installing air duct for glove compartment cooling	385
8.8	Removing and installing air duct (rear)	386
8.9	Removing and installing air duct for rear vent	386
8.10	Removing and installing forced ventilation vents in passenger compartment	387
8.11	Checking forced ventilation vents in passenger compartment	387
8.12	Removing and installing fresh air intake	388
8.13	Removing and installing cover for fresh air intake	391
8.14	Checking plenum chamber water drain	391
8.15	Cleaning plenum chamber water drain	392
<b>9</b>	<b>Coolant circuit</b>	<b>393</b>
9.1	Assembly overview - high-voltage heater (PTC) Z115	393
9.2	Integration of heater and air conditioning unit into engine coolant circuit	394
9.3	Removing and installing high-voltage heater (PTC) Z115 (with high-voltage heater (PTC) control unit J848)	400
<b>10</b>	<b>Operating and display unit</b>	<b>407</b>
10.1	Overview - operating and display unit	407
10.2	Removing and installing rear operating and display unit	408
<b>11</b>	<b>Further control components</b>	<b>410</b>
11.1	Removing and installing air quality sensor G238/external air quality and air humidity sensor G935	410
11.2	Removing and installing ambient temperature sensor G17	411
11.3	Removing and installing front chest vent temperature sensor G385/G386	411
11.4	Removing and installing left footwell vent temperature sender G261	413
11.5	Removing and installing right footwell vent temperature sender G262	414
11.6	Removing and installing evaporator output temperature sender G263	414
11.7	Removing and installing rear left chest vent temperature sender G635/rear right chest vent temperature sender G636	415
11.8	Removing and installing vent temperature sender for rear left footwell G637/vent temperature sender for rear right footwell G638	416
11.9	Removing and installing dash panel temperature sensor G56	417



11.10	Removing and installing humidity sender G355	417
11.11	Removing and installing thermal management control unit J1024	417
<b>12</b>	<b>Air quality improvement system</b>	<b>419</b>
12.1	Overview of fitting locations - air quality improvement system	419
12.2	Assembly overview - fragrance diffuser system	421
12.3	Removing and installing control unit for fragrance diffuser system J1101 with blower for fragrance diffuser system V686	423
12.4	Removing and installing function unit for fragrance diffuser system GX43	424
12.5	Removing and installing control motor for fragrance diffuser system V687	426
12.6	Removing and installing temperature sensor for fragrance diffuser system G1056	427
12.7	Removing and installing hoses for fragrance diffuser system	428
12.8	Removing and installing ioniser control unit J897	429
12.9	Removing and installing driver side ioniser J1105	430
12.10	Removing and installing passenger side ioniser J1106	431
12.11	Removing and installing air conditioner sensor for fine particle concentration G930	432