3 Technical data

3.1 Airtronic S2 D2L

Heater type			Airtronic		
Heater			Airtronic S2		
Version			D2L		
Heating medium			Air		
Fuel For information on “Fuel quality” and “Fuel at low temperatures” see page 8.			Diesel – standard commercially available (EN 590)		
Control of the heat flow			Maximum	Minimum	Off
Heat flow (watt)			2200	850	–
Hot air throughput without backpressure (kg/h) with hood 75 mm			105	42	13
Fuel consumption (l/h)			0.28	0.1	–
Average electrical power consumption (watt)		during operation	31	6	4
		while starting	≤ 100		
Closed-circuit power consumption			100 µA		
Rated voltage			12 volt or 24 volt		
Operating range Lower voltage limit: An undervoltage protector installed in the control box switches off the heater if the voltage limit is reached.			approx. 10.5 volt or 21.4 volt Undervoltage protection response time: 20 seconds ±1		
Upper voltage limit: An overvoltage protector (surge suppressor) installed in the control box switches off the heater if the voltage limit is reached.			approx. 16 volt or approx. 32 volt Overvoltage protection response time: 20 seconds ±1		
Ambient temperature	Heater	during operation	–40 °C to +70 °C		
		not in operation	–40 °C to +85 °C		
	Metering pump	during operation	–40 °C to +50 °C		
		not in operation	–40 °C to +125 °C		
Hot air intake temperature			max. +40 °C		
Combustion air temperature			max. +50 °C		
Interference suppression			Suppression class 5 to EN 55025		
Degree of protection in accordance with ISO 20653		during operation	IP5k4k		
		not in operation	IP5k6k and IP5k9k		
Weight			approx. 2.7 kg		
Ventilation mode			possible		

Attention!
Safety instructions for technical data!
Failure to comply with the technical data can result in malfunctions.

Note
Provided no other values are given, the technical data provided is with the usual tolerances of ±10 % at rated voltage, 20 °C ambient temperature and reference altitude Esslingen.

3.5 Control values

3.5.1 Resistance values

Resistance values at 20 °C	12 volt	24 volt
Glow plug	0.42 Ω – 0.70 Ω	1.2 Ω – 2.0 Ω
Metering pump	9.5 Ω ±0.50 Ω	36.0 Ω ±1.8 Ω

Control unit resistance values	Left stop switch position	Right stop switch position
Mini controller	min. 1730 Ω	min. 2120 Ω
(12 volt / 24 volt)	max. 1780 Ω	max. 2240 Ω

3.5.2 Exhaust value

CO_2 in the exhaust

in “Power” control stage: 7.5 – 12.5 % by vol.

Bacharach soot number: < 4

3.5.3 Checking the “external” temperature sensor

(Order No.: 25.1774.89.0300)

The “external” temperature sensor must be checked using a digital multimeter. Replace the temperature sensor if the resistance value is not the same as the curve in the diagram or the table of values.

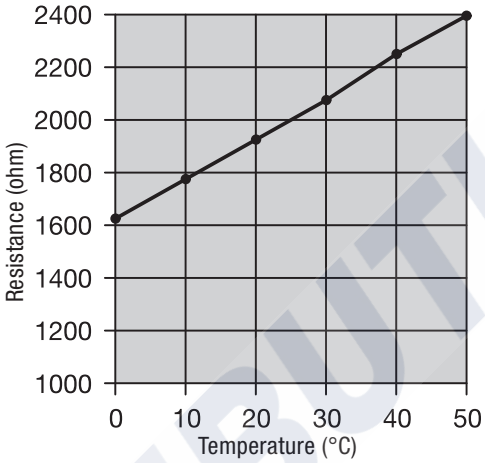

Table of values – “External” temperature sensor

Temperature °C	Resistance Ω	
	min.	max.
0	1600	1660
5	1670	1730
10	1745	1800
15	1820	1870
20	1895	1950
25	1970	2030
30	2050	2110
35	2130	2190
40	2210	2280
45	2295	2370

4 Troubleshooting

4.1 What to check first in case of faults

- Check
  - Fuel in the tank?
  - Fuel lines leaking? (Visual check)
  - Summer diesel in the fuel line?
  - Combustion air system or exhaust system damaged or blocked?
  - Hot air system blocked?
  - New generation control box installed?
    Features:
    > Control box cable loom wound with cable tape
- Electrical components
  - Cables, connections damaged?
  - Contacts corroded?
  - Fuses defective?
  - Incorrect wiring? (short circuits, interrupted / broken)
- Measure battery voltage
  - Battery voltage < 10.5 volt: the undervoltage protection of the 12 volt heater has triggered.
  - Battery voltage < 21.5 volt: the undervoltage protection of the 24 volt heater has triggered.
- Measure voltage supply (Terminal 30)
  - Disconnect the 10-pin connector XS10 / XB10 and measure the applied voltage in connector B1 between chamber 2 (br) and chamber 4 (rd).
  - If it differs from the battery voltage, check the fuses, the supply cables, the negative connection and the positive support point on the battery for voltage drop (corrosion / interruption).

4.2 Control box is locked

The control box is locked if the following faults occur:

- Unsuccessful start attempts
  - After 10 consecutive failed start attempts.
- Overheating
  - After 10-times shutdown on overheating.

4.3 Unlocking the control box

In case of locking due to too many overheating events, the control box can be unlocked by removing the heater fuse:

- Switch on heater.
- Remove heater fuse within 20 seconds.
- Re-insert the heater fuse after around 5 seconds.

Note

The control box can also be unlocked using test equipment / a control unit. For the procedure and description for testing equipment and control units, see “Installation Instructions Plus – EasyStart / Altitude Kit / Special Functions and Diagnosis”.

4.4 Overview of the test equipment and control units suitable for diagnosis

The electronic control box can store up to 20 faults, which can be read out and displayed (10 active faults, 10 stored faults). The following test equipment and control units can be used to query the fault memory in the control box and if necessary, to delete the locking of the control box:

Test equipment	**Order No.:**
▪ EasyScan	22.1550.89.0000

The following control units can also be used:

Control units	**Order No.:**
▪ EasyStart Remote+	22.1000.34.1700
▪ Easy Start Pro	22.1000.35.2200
▪ EasyStart Web	22.1000.34.5100
▪ EasyStart Web	22.1000.34.7800

Note

- If the readout is made using a LIN control unit, only 1 active and 5 stored faults are displayed.
- Control units connected to the heater via the switch input S+ cannot be used for diagnosis.

4.5 Notes on heater diagnosis with control units

4.5.1 Easy Start Pro

Note

For details of how to read out the heat faults, see ES Pro installation instructions

4.5.2 EasyStart Web

Note

The heater faults are read out via the workshop access of the web application, see also PLUS installation instructions

4.5.3 EasyStart Remote+

- Connection via LIN interface

If faults occur while the heater is running, they are displayed with “Err” after the mobile unit is activated.

The current fault is displayed. The stored faults “F1” to “F5” can be enquired.

4.6 Flashing code display

4.6.1 Function display and error output via flashing code

Output of the operating display (combustion mode or output control):

→ LED lights up permanently

In case of error:

→ Output of the current error as a flashing code (see table)

2 s	4 s	6 s	8 s	No.	Error
				0	No fault / normal operation
				1	Locking due to overheating
				2	Overvoltage cut-off
				3	Undervoltage cut-off
				4	Glow plug is defective
				5	Burner motor is defective
				6	Invalid configuration
				7	Safety time exceeded
				8	Overheating
				9	Metering pump is defective
				10	Ext. Temperature sensor / setpoint transmitter is defective
				11	Combination sensor is defective
				12	Flame cutout
				13	Too many exceedances of “safety time 1”[1)]
				14	Control box defective
				15	Other errors: EasyScan diagnosis necessary

1) Exceeding of the allowable number of starts

4.7 Fault code table

Fault code **P000…** for EasyScan and TP 7.1 (if connected via CAN) **(…)** for TP 7 (LIN)	**Error description**	**Cause** ▪ Remedial action	**Error class** for control elements TP7.1: ▪ EasyStart Web ▪ EasyStart Pro
P000100 (071) **P000101** (072) **P000102** (073)	Overheating/air outlet sensor – Interruption – Short circuit – Short circuit to battery (+)	▪ Check overheating sensor. – Check cables for continuity, short circuit and damage. – Unplug connector -XB2, measure resistance between cable BU (chamber 1) and cable BNWH (chamber 2). – Measured values see page 28, in case of deviating values –> renew lead harness of heater.	**1**: Service
P000110 (087) **P000111** (088) **P000112** (089)	Air inlet error – Interruption – Short circuit – Short circuit to battery (+)	▪ Check the air inlet sensor. – In case of visible damage –> replace control box. ▪ Delete fault memory. – If the error continues to be displayed –> replace control box.	**1**: Service
P00010A (051)	Cold blowing – Timeout	The combustion chamber has not cooled sufficiently for a restart. ▪ Check whether hot combustion air is drawn in. If not –> check flame sensor, see Fault code P000120 (064) and Fault code P000121 (065).	**1**: Service
P000114 (014)	Possible risk of overheating (implausible signal) **Note!** Fault code P000114 (014) is displayed only if ▪ the heater is in operation ▪ Temperature reached at overheating sensor at least 80 °C.	Temperature difference between the flame and overheating sensor is too large. ▪ For remedial action see Fault code P000115 (012). ▪ Check flame sensor. – Unplug connector -XB2, measure resistance between cable BNWH (chamber 2) and cable GN (chamber 3). – Measured values see page 28, in case of deviating values –> renew lead harness of heater.	**1**: Service
P000115 (012)	Overheating – Software threshold exceeded	Temperature at overheating sensor >125 °C ▪ Check air throughput ▪ Check overheating sensor – Check cables for continuity, short circuit and damage. – Unplug connector -XB2, measure resistance between cable BU (chamber 1) and cable BNWH (chamber 2). – Measured values see page 28, in case of deviating values –> renew lead harness of heater.	**5**: Air Ducting or Outlet
P000116 (017)	Overheating – Hardware threshold exceeded	Temperature at overheating sensor >130 °C ▪ For remedial action see Fault code P000115 (012). ▪ Check overheating sensor. – Check cables for continuity, short circuit and damage. – Unplug connector -XB2, measure resistance between cable BU (chamber 1) and cable BNWH (chamber 2). – Measured values see page 28, in case of deviating values –> renew lead harness of heater.	**5**: Air Ducting or Outlet

Fault code **P000…** for EasyScan and TP 7.1 (if connected via CAN) **(…)** for TP 7 (LIN)	**Error description**	**Cause** ▪ Remedial action	**Error class** for control elements TP7.1: ▪ EasyStart Web ▪ EasyStart Pro
P00011A (015)	Operating lock-out – Too many overheating events detected	The control box is locked due to too frequent consecutive overheating (Fault code P000114 (014), Fault code P000115 (012)). ▪ For remedial action see Fault code P000114 (014), Fault code P000115 (012). ▪ Unlock control box, see Chapter 4.3, p. 13.	**6**: Overheat. Heater locked
P000120 (064) **P000121** (065) **P000122**	Flame sensor – Interruption – Short circuit – Short circuit to battery (+)	▪ Check flame sensor. – Check cable for continuity, short circuit and damage. – Unplug connector -XB2, measure resistance between cable BU (chamber 1) and cable GN (chamber 2). – Measured values see page 28, in case of deviating values –> renew lead harness of heater. ▪ Further display Fault code P000120 (064) and Fault code P000121 (065) –> replace control box, see Chapter 5.4.2, p. 24.	**1**: Service
P000125 (057) **P000126** (053) **P000127** (054) **P000128** (055) **P000129** (056)	Flame cutout from start process Flame cutout within the control range 0% – 25% Flame cutout within the control range 25% – 50% Flame cutout within the control range 50% – 75% Flame cutout within the control range 75% – 100% **Note!** In case of flame cutout during the start phase or in normal operation the heater is restarted (max. 5 times). If the restart was successful, the fault code display is deleted.	▪ Check exhaust and combustion air system. ▪ Check fuel quantity and fuel supply, see Chapter 5.6, p. 35. ▪ Check flame sensor, see Fault code P000120 (064) and Fault code P000121 (065).	**1**: Service
P00012A (052)	Unsuccessful start procedure	▪ Check exhaust and combustion air system. ▪ Check fuel quantity and fuel supply, see Chapter 5.6, p. 35. ▪ Renew the fuel filter. ▪ Clean the fuel filter in the connection socket of the metering pump.	**4**: Fuel Supply or Pump

Fault code **P000…** for EasyScan and TP 7.1 (if connected via CAN) **(…)** for TP 7 (LIN)	**Error description**	**Cause** ▪ Remedial action	**Error class** for control elements TP7.1: ▪ EasyStart Web ▪ EasyStart Pro
P00012B (050)	Operation inhibit, too many unsuccessful start procedures	Following 10 unsuccessful start attempts the control box is locked. ▪ Unlock control box, see Chapter 4.3, p. 13. ▪ Check fuel quantity and fuel supply, see Chapter 5.6, p. 35.	**1**: Service
P000130 (060)	External air temperature sensor (LEF2) – Interruption	▪ Test external air inlet sensor ▪ Disconnect the GYRD / BNWH plug-in connection of the external sensor and measure the resistance value, diagram and table of values see page 13, – if temperature sensor is ok, re-connect the GYRD / BNWH plug-in connection. ▪ Disconnect connector XS12/XB12 at the heater and measure the resistance value in connector housing XB12 between PIN 6 and PIN 12. If an interruption occurs, the ohmic value is > 7175 Ω / > 3 kΩ. ▪ If resistance value is ok –> replace control box.	**7**: Restricted Operation
P000131 (061) **P000132**	External air temperature sensor (LEF2) – Short circuit – Short circuit to battery (+)	▪ Test external air inlet sensor ▪ Disconnect the GYRD / BNWH plug-in connection of the external temperature sensor and measure the resistance value, diagram and table of values see page 13, – if ok, re-connect the GYRD / BNWH plug-in connection. ▪ Disconnect connector XS12/XB12 at the heater and measure the resistance value in connector housing XB12 between PIN 6 and PIN 12. In case of short circuit, the ohmic value is < 486 Ω / < 800 Ω. ▪ If the error P000131 (061) continues to be displayed –> replace control box.	**7**: Restricted Operation
P000143 (006)	Air pressure sensor – Implausible signal	▪ Delete error and try again. ▪ If error occurs again, replace control box.	**7**: Notlauf
P000200 (048) **P000201** (047)	Metering pump – Interruption – Short circuit	▪ Check metering pump lead harness for continuity, short circuit and damage. – Lead harness ok –> renew the metering pump.	**4**: Fuel Supply or Pump
P000202 (049)	Metering pump – Short circuit to battery (+) or transistor error	▪ Check cables for continuity, short circuit and damage. – Unplug the connector at the metering pump. ▪ Display Fault code P000200 (048) metering pump defective –> replace metering pump.	**4**: Fuel Supply or Pump

Fault code **P000…** for EasyScan and TP 7.1 (if connected via CAN) **(…)** for TP 7 (LIN)	Error description	Cause ▪ Remedial action	Error class for control elements TP7.1: ▪ EasyStart Web ▪ EasyStart Pro
P000210 (020) **P000211** (021) **P000212** (022)	Glow plug – Interruption – Short circuit – Short circuit to battery (+) or transistor error **Caution!** **Damage to unit in case of overvoltage** Voltage > 9.5 V irreparably damages the glow plug. → Test function with max. 9.5 V. **Note** Note the short-circuit withstand capability of the power pack.	▪ Check glow plug. – Check cables for continuity, short circuit and damage. – Unplug connector -XB4, unclip cable WH (chamber 3) and cable WH (chamber 4). – Apply 9.5 V ±0.1 V voltage to the glow plug and after 25 sec measure the current intensity. – Measured value 9.5 A (+1 / –1.5) the glow plug is ok – In case of deviating values –> replace glow plug.	**1**: Service
P000213 (019)	Glow plug – Ignition energy too low	Glow plug energy input is too low. ▪ Check cables for continuity, short circuit and damage. ▪ Test glow plug, see Fault code P000210 (020) to Fault code P000212 (022).	**1**: Service
P000220 (031) **P000221** (032) **P000222** (034)	Electric motor – interruption Electric motor – short circuit Electric motor – short circuit downstream of +Ub or transistor error	▪ Visual inspection of electric motor / control unit (contacting). ▪ Check electric motor for dirt / corrosion, clean if necessary. ▪ Check blower wheel for blockage, remove blockage if necessary. ▪ Replace electric motor if necessary.	**1**: Service
P000223 (033) **P000224** (035)	Burner motor – Blocking – Current input too high	Impeller blocked (frozen, soiled, sluggish, ...). ▪ Remove blockage. – Check electric motor for smooth and easy running by turning the impeller manually. **Note!** In the case of the **Airtronic D4L 24V**, during running heating mode and simultaneous motor start and undervoltage of the vehicle battery, in exceptional cases, error message P000223 (033) can occur, although no valid faults exist. ▪ Delete faults using EasyScan and acknowledge in the control unit on occurrence. Further display Fault code P000300 (074) ▪ Renew fan, see Chapter 5.4.10, p. 29.	**1**: Service
P000260 **P000261** **P000262**	Universal output – Interruption – Short circuit – Short circuit to battery (+) or transistor error	Test universal output. ▪ Test WHRD conductor for continuity, short circuit and damage. ▪ If cable ok –> replace control box.	**1**: Service

Fault code **P000…** for EasyScan and TP 7.1 (if connected via CAN) **(…)** for TP 7 (LIN)	**Error description**	**Cause** ▪ Remedial action	**Error class** for control elements TP7.1: ▪ EasyStart Web ▪ EasyStart Pro
P000300 (074)	Overheating detection Metering pump hardware or cutout circuit defective	▪ Test air outlet sensor. – Check cables for continuity, short circuit and damage. – Unplug connector XB4, measure resistance between cable RD (chamber 9) and cable RD (chamber 10). – Measured values see page 28, in case of deviating values –> renew lead harness of heater. ▪ Further display Fault code P000300 (074) –> replace lead harness of the heater. ▪ Unlock control box, see Chapter 4.3, p. 13..	**1**: Service
P000301 (090) **P000302** (090)	Watchdog reset Too many watchdog resets	▪ Delete errors, the heater remains ready for operation. ▪ Replace control box, see Chapter 5.4.2, p. 24	**1**: Service
P000303 (099)	Operating lockout: Too frequent output stage errors	▪ Replace control box, see Chapter 5.4.2, p. 24	**1**: Service
P000304 (091)	Too many resets (loose contact)	▪ Replace control box, see Chapter 5.4.2, p. 24	**1**: Service
P000305 (095)	Control box not calibrated	▪ Replace control box, see Chapter 5.4.2, p. 24	**1**: Service
P000306 (098)	Second cutout circuit is defective	▪ Replace control box, see Chapter 5.4.2, p. 24	**1**: Service
P000307 (081)	CAN communication error in control unit		**1**: Service
P00030A	CAN communication error	Delete error. Heater remains ready for operation.	**1**: Service
P000310 (010) **P000311** (010)	Control box cutout due to overvoltage Heater cutout due to overvoltage **Note!** Heater is not functioning.	Overvoltage applied at the control box without interruption for at least 20 seconds. ▪ Unplug connector -XB1 at the heater. ▪ Start the vehicle engine. ▪ Measure voltage between cable RD (chamber 1) and cable BN (chamber 2). – Airtronic 12 volt – voltage > 16 V –> check generator controller – Airtronic 24 volt – voltage > 32 V –> check generator controller – Check the battery.	**3**: Overvoltage
P000312 (011) **P000313** (011)	Control box cutout due to undervoltage Heater cutout due to undervoltage **Note!** Heater is not functioning.	Undervoltage applied at the control box without interruption for at least 20 seconds. ▪ Unplug connector -XB1 at the heater. ▪ Start the vehicle engine. ▪ Measure voltage between cable RD (chamber 1) and cable BN (chamber 2). – Airtronic 12 volt – voltage < 10 V –> check generator controller – Airtronic 24 volt – voltage < 21 V –> check generator controller – Check the fuses, the supply cables, the ground connections and the positive terminal post at the battery for voltage drop (corrosion).	**2**: Undervoltage
P000330 (092)	ROM error	▪ Replace control box, see Chapter 5.4.2, p. 24	**1**: Service
P000331 (093)	RAM error	▪ Replace control box, see Chapter 5.4.2, p. 24	**1**: Service

Fault code **P000…** for EasyScan and TP 7.1 (if connected via CAN) **(…)** for TP 7 (LIN)	**Error description**	**Cause** ▪ Remedial action	**Error class** for control elements TP7.1: ▪ EasyStart Web ▪ EasyStart Pro
P000332 (094)	NVMEM error (EEPROM, DataFlash)	▪ Replace control box, see Chapter 5.4.2, p. 24	**1**: Service
P000342	Invalid configuration	Check ADR coding.	**1**: Service
P000394	ADR button – Short circuit	▪ Test ADR button. – Check the cables at GYRD / BNWH for continuity, short-circuit and damage. – If cables ok –> replace control box.	**1**: Service
P000440 (083)	Timeout, communication with control unit	▪ Delete errors and disconnect heater from the power supply. ▪ If error occurs again –> replace control unit.	**0**: No message

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