REPAIR INSTRUCTIONS
AIRTRONIC S3 COMMERCIAL
AIRTRONIC M3 COMMERCIAL / AIRTRONIC M3 RECREATIONAL
AIRTRONIC L3 RECREATIONAL / AIRTRONIC XL3 COMMERCIAL

The repair instructions are valid for the following engine-independent air heaters:

Air heaters for diesel fuel		**Order No.**
Airtronic S3	D2L 12 V	25.2953.05.0000
Airtronic S3	D2L 12 V*	25.3066.05.0000**
Airtronic S3	D2L 12 V CI-Bus	25.3092.05.0000**
Airtronic S3	D2L 12 V* CI-Bus	25.3093.05.0000**
Airtronic S3	D2L 12 V VDP	25.3034.05.0000**
Airtronic S3	D2L 24 V	25.2954.05.0000
Airtronic S3	D2L 24 V ADR	25.3038.05.0000**
Airtronic M3	D4L 12 V	25.2955.05.0000
Airtronic M3	D4L 12 V VDP	25.3035.05.0000**
Airtronic M3	D4L 24 V	25.2956.05.0000
Airtronic M3	D4L 24 V ADR	25.3039.05.0000**
Airtronic M3	D4R 12 V	25.2957.05.0000
Airtronic M3	D4R 12 V VDP	25.3036.05.0000**
Airtronic M3	D4R 12 V CI-Bus	25.3051.05.0000**
Airtronic M3	D4R 24 V	25.2958.05.0000
Airtronic L3	D6L 12 V	25.2959.05.0000
Airtronic L3	D6L 12 V VDP	25.3037.05.0000**
Airtronic L3	D6L 24 V	25.2960.05.0000
Airtronic XL3	D8L 24 V	25.3020.05.0000

*) Cable outlet, left
**) Not available for North America

Air heaters for petrol		**Order No.**
Airtronic S3	B2L 12 V	20.2029.05.0000
Airtronic M3	B4L 12 V	20.2030.05.0000
Airtronic M3	B4R 12 V	20.2031.05.0000

A WORLD OF COMFORT

Eberspächer

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1 Introduction

1.1 Concept of this document

This document assists the workshop with troubleshooting and repair of the heater.

The document is divided into the following chapters to make it easier to find information quickly.

1 Introduction
Important, introductory information about the structure of this documentation, safety and intended use of the heater

2 Function and operation
Basic information on the function and operation of the heater

3 Technical data
Technical data of the heater

4 Troubleshooting
Information about unlocking the control box and the fault codes of the heater, their meaning and troubleshooting measures / remedies based on a clear table

5 Repair instructions
Information about special tools, dismantling and assembly of the heater's components as well as a component drawing

6 Electrics / Circuit diagram
Information on the electrical components and circuit diagrams of the heater and the cable harness

7 Environment
Information about certification and disposal of the heater

8 Service
Information about setup times and technical support

1.2 General information

This document is used to correct faults and to carry out repairs for the heaters listed on the title page, and is valid to the exclusion of all liability claims. The necessary work may only be carried out by appropriately trained personnel of an Eberspächer service partner.

Depending on the version or revision status of the heater, differences may occur compared to this documentation. Please check this before carrying out the repair and take any possible differences into account.

1.3 Reference documents

Technical description
Describes the function and proper installation and contains all information necessary for safe operation of the heater.

Spare parts list
Contains the information necessary for ordering spare parts.

Installation recommendation (heater-dependent)
Describes vehicle-specific installation situations.

Installation Instructions Plus
Supplementary information on heaters and control units.

1.4 Special text formats and presentations

Special text formats and picture symbols are used in this document to emphasise different situations and subjects. Please refer to the following examples for their meanings and appropriate action.

1.4.1 Lists

- This dot (▪) indicates a list or action step, introduced by a heading.
  – If an indented dash (–) follows a "dot", this list/action step is a sub-section/secondary step of the black dot.

1.4.2 Cross references

Underlined blue text denotes a cross-reference, which can be clicked in the PDF format. The part of the document named in the text is then displayed.

1.5 Picture symbols

§ Regulation!
This information indicates a statutory regulation. Any violation of these regulations results in expiry of the type-approval for the heater and exclusion of any guarantee and liability claims against Eberspächer Climate Control Systems International GmbH.

Danger!
This information indicates an imminent risk to life and limb. Failure to avoid this hazard will result in death or severe injuries.
→ This arrow indicates appropriate precautions to take to avert the danger.

Warning!
This information indicates a potentially imminent risk to life and limb. Failure to avoid this hazard can result in death or severe injuries.
→ This arrow indicates appropriate precautions to take to avert the danger.

Caution!
This information indicates a potentially imminent risk. Ignoring this information can result in slight or minor injuries.
→ This arrow indicates appropriate precautions to take to avert the danger.

Note

These remarks contain recommendations for use and useful tips for the operation, installation and repair of the heater.

1.6 Intended use

1.6.1 Range of application of the heater

The air heater operating independently of an engine is intended for installation in the following vehicles:

- All types of vehicles (max. 8 seats + driver's seat) and their trailers
- Construction machinery
- Agricultural machinery
- Boats, ships and yachts (only diesel heaters)
- Camper vans

1.6.2 Intended use of the heater

- Pre-heating, de-misting windows
- Heating and keeping the following warm:
  - Driver and working cabs, ship's cabins
  - Freight compartments
  - Passenger and crew compartments
  - Camper vans

Note

Only use and operate the heater within the scope of the intended use stated by the manufacturer and in compliance with the documentation enclosed with each heater.

1.7 Non-intended use

On account of its functional purpose, the heater is not approved for the following applications:

- Long-term continuous operation, e.g. for heating:
  - Residential rooms
  - Garages
  - Work huts, weekend homes and hunting lodges
  - Houseboats, etc.
- Heating or drying of:
  - Living creatures (people or animals) by blowing hot air directly at them
  - Objects
  - Blowing hot air into containers

1.8 Safety instructions

Danger!

Fire hazard. Risk of poisoning due to exhaust gases.

Improper repair or installation can result in toxic exhaust gases getting into the interior of the vehicle or a fire.

→ Repair and installation of the heater by authorised and trained skilled personnel only.
→ Use original spare parts only.
→ Comply with the official regulations.
→ Take into account and follow this document and all applicable documentation.

Note

- Comply with the vehicle manufacturer's instructions.
- In case of electric welding work on the vehicle, disconnect the positive pole from the battery and connect it to ground.

1.9 Warranty and liability

Eberspächer Climate Control Systems International GmbH does not accept any liability whatsoever for defects and damage, which are due to installation or repair by unauthorised and untrained persons.

Compliance with official regulations and the safety instructions is prerequisite for liability claims. Failure to comply with official regulations and safety instructions leads to exclusion of any liability of the manufacturer.

1.10 Accident prevention

Always follow all general accident prevention regulations as well as workshop and operating safety instructions.

1.11 Functional test following a repair

- After installing the heater, the whole fuel supply system must be carefully vented: please refer to and follow the vehicle manufacturer's instructions.
- Switch on the heater at the control unit and during the trial run, check all water and fuel connections for leaks and tight fit.
- Correct any faults during operation with the help of diagnostic equipment or the control unit.

Note

The function of the heater is described in detail in the “Technical Description” document.

Emergency stop – EMERGENCY OFF

In an emergency carry out an emergency shutdown as follows:

- Switch off the heater via the control unit or disconnect it from the power supply (remove fuse / disconnect battery).

2 Function and operation

2.1 Functional description

2.1.1 Switching on

When the heater is switched on, the control lamp/illuminated rink in the control unit lights up. The glow plug is switched on and the fan starts at low speed.

Note

- The heater can only be switched on if the actual temperature value at the temperature sensor is less than the internal temperature setpoint of the heater.
- If there is still too much residual heat in the heat exchanger from when the heater was last used, firstly only the fan starts up (cold blowing). Once the residual heat has been cleared, the heater starts.
- Only the burner motor is activated for the “Ventilate” function.

Starting the Airtronic

The start sequences are sensor controlled and depend on the ambient temperature. The heater controls the heating level and output automatically and continuously according to the ambient conditions and the heating output requirement. After the flame sensor has detected the flame, the glow plug is switched off. The heater is now in normal operation.

2.1.2 Temperature selection with the control unit

The control unit can be used to preselect the interior temperature. The resulting temperature can be within the range of +5 °C to +38 °C and depends on the selected heater, on the size of the space to be heated and on the prevailing outdoor temperature. The setting to be selected at the control unit is an empirical value.

Note

If a temperature setpoint is not selected at the control unit, the heater heats according to a temperature setpoint specified internally in the system. The temperature setpoint is 20° C.

2.1.3 Control in heating mode

During heating mode, the room temperature or the temperature of the hot air drawn in is measured constantly. The control begins on approaching the required (preselected) temperature. The heating output is controlled continuously, so that fine adjustment of the heat flow supplied by the heater to the heat requirement is possible. The fan speed and fuel quantity correspond to the respective control stage.

If the set temperature is still exceeded in the smallest control stage, the heater goes to the “OFF” stage with the fan running on for approx. 4 minutes to cool down. The fan then continues running at minimum speed (circulation mode) until the restart or is switched off (fresh air mode with external temperature sensor).

2.1.4 Ventilator mode

The EasyStart R+* and EasyStart Pro control units and the mini controller can be used to activate the “Ventilate” function. The “Heat / Ventilate” switch is also required for the module timer and the control unit, whereby for fan operation, the “Heat / Ventilate” switch must be actuated first and then the heater must be switched on. The fan runs in ventilator mode with constant speed.

*) Not available for North America

2.1.5 Switch off

When the heater is switched off, the control lamp goes out and the fuel delivery is switched off. The fan runs on for approx. 4 minutes to cool down. The glow plug is switched on for several seconds to clean it during the fan after-running.

Special case: If no fuel has been delivered or if the heater is in the “OFF” stage until it is switched off, the heater is stopped without any after-running.

2.2 Control and safety devices

- The start sequence is sensor controlled. The length of the start sequence varies depending on the basic conditions such as voltage supply, fuel quality, outdoor temperature, etc. In case of very unfavourable conditions, e.g. a weak vehicle battery, the start sequence can last up to 4 minutes. There is no automatic restart. Depending on the basic conditions, the after-running can also last up to 4 minutes.
- If the flame goes off by itself during normal operation, the heater is restarted first. If the heater does not ignite the flame within a good minute after the fuel delivery has restarted or if it ignites but the flame goes out again within the starting sequence, a safety lockout (shutdown on faults) takes place, i.e. fuel delivery [OFF] and fan after-running of approx. 4 minutes. The safety lock-out can be cancelled by briefly switching off and on again.

Note

Do not repeat the switching off/on sequence more than 10 times.

- In the event of overheating, the combined sensor (flame sensor/ overheating sensor) triggers, the fuel supply is interrupted and a safety lock-out occurs. Once the cause of the overheating has been eliminated, the heater can be re-started by switching off and on again.
- If the lower or upper voltage limit is reached, a shutdown on faults takes place after 20 seconds.
- The heater does not start up when the glow plug or the fan motor is defective or when the electric lead to the metering pump is interrupted.
- If the combined sensor (flame/overheating sensor) is defective or the electric lead is interrupted, the heater starts and the safety lockout (shutdown on faults) does not take place until during the start phase.

- The speed of the fan motor is monitored continuously. If the fan motor does not start or if the speed deviates significantly, safety lockout (shutdown on faults) takes place.
- When the heater is switched off, the glow plug is switched on for several seconds (after glowing) while the fan carries on running to clean off any combustion residues.

Note

- If the burner motor fails there is no after-running.
- Do not repeat the switching off/on sequence more than 10 times.

2.2.1 Forced shut-down in ADR mode (only for 24 V heaters)*

In vehicles for the transport of dangerous goods (e.g. tanker trucks), the heater must be switched off before the truck drives into a danger area (refinery, petrol station, etc.).

Failure to comply results in the heater switching off automatically when:

- the vehicle engine is switched off.
- an additional unit is switched on (auxiliary drive for unloading pump, etc.).

The fan then carries on running briefly for max. 40 seconds.

*) Not applicable for North America

2.3 Emergency stop – EMERGENCY OFF

If an emergency stop – EMERGENCY OFF – is necessary during operation, proceed as follows:
Switch the heater off at the control unit or
remove the fuse or
disconnect the heater from the battery.

3 Technical data

3.1 Technical data for diesel heaters

3.1.1 Airtronic S3 D2L

Heater type			Airtronic S3					
Version			D2L					
Heating medium			Air					
Fuel			Diesel – standard commercially available (EN 590)					
Control of the heat flow			Maximum		Minimum		Pause mode	
Heat flow (watt)			2200		850		–	
Hot air throughput without backpressure (kg/h) with hood 75 mm			105		50		20	
Fuel consumption (l/h)			0.27		0.1		–	
Average electrical power consumption (watt)			12 V	24 V	12 V	24 V	12 V	24 V
		during operation	27	28	6	9	4	7
		while starting	12 V: ≤ 90 24 V: ≤ 80					
Closed-circuit power consumption			100 µA					
Rated voltage			12 volt or 24 volt					
Operating range Lower voltage limit: Undervoltage protection installed in the control box switches off the heater on reaching the voltage limit*).			approx. 10.5 volt or approx. 21 volt Undervoltage protection response time: 20 seconds ±1					
Upper voltage limit: Overvoltage protection installed in the control box switches off the heater on reaching the voltage limit.			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. 2.5 kg					
Ventilation mode			possible					

*) The undervoltage limits of the heater must be taken into consideration in the use and design of a battery management system. An installed battery management system may only switch off the heater's power supply below the voltage limits if the response time of 20 seconds ±1 second is taken into consideration.

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.

3.1.2 Airtronic M3 D4L

Heater type			Airtronic M3					
Version			D4L					
Heating medium			Air					
Fuel			Diesel – standard commercially available (EN 590)					
Control of the heat flow			Maximum		Minimum		Pause mode	
Heat flow (watt)			4000		1050		–	
Hot air throughput without backpressure (kg/h) with hood 75 mm			185		40		35	
Fuel consumption (l/h)			0.49		0.12		–	
Average electrical power consumption (watt)			12 V	24 V	12 V	24 V	12 V	24 V
		during operation	37	39	6	9	4	7
		while starting	12 V: ≤ 105 24 V: ≤ 100					
Closed-circuit power consumption			100 µA					
Rated voltage			12 volt or 24 volt					
Operating range Lower voltage limit: Undervoltage protection installed in the control box switches off the heater on reaching the voltage limit*).			approx. 10.5 volt or approx. 21 volt Undervoltage protection response time: 20 seconds ±1					
Upper voltage limit: Overvoltage protection installed in the control box switches off the heater on reaching the voltage limit.			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. 4.5 kg					
Ventilation mode			possible					

*) The undervoltage limits of the heater must be taken into consideration in the use and design of a battery management system. An installed battery management system may only switch off the heater's power supply below the voltage limits if the response time of 20 seconds ±1 second is taken into consideration.

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.

3.1.3 Airtronic M3 D4R

Heater type			Airtronic M3					
Version			D4R					
Heating medium			Air					
Fuel			Diesel – standard commercially available (EN 590)					
Control of the heat flow			Maximum		Minimum		Pause mode	
Heat flow (watt)			4000		1050		–	
Hot air throughput without backpressure (kg/h) with hood 75 mm			190		45		37	
Fuel consumption (l/h)			0.49		0.12		–	
Average electrical power consumption (watt)			12 V	24 V	12 V	24 V	12 V	24 V
		during operation	53	55	7	10	5	8
		while starting	≤ 105					
Closed-circuit power consumption			100 µA					
Rated voltage			12 volt or 24 volt					
Operating range Lower voltage limit: Undervoltage protection installed in the control box switches off the heater on reaching the voltage limit*).			approx. 10.5 volt or approx. 21 volt Undervoltage protection response time: 20 seconds ±1					
Upper voltage limit: Overvoltage protection installed in the control box switches off the heater on reaching the voltage limit.			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. 4.5 kg					
Ventilation mode			possible					

*) The undervoltage limits of the heater must be taken into consideration in the use and design of a battery management system. An installed battery management system may only switch off the heater's power supply below the voltage limits if the response time of 20 seconds ±1 second is taken into consideration.

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.

3.1.4 Airtronic L3 D6L

Heater type			Airtronic L3					
Version			D6L					
Heating medium			Air					
Fuel			Diesel – standard commercially available (EN 590)					
Control of the heat flow			Maximum		Minimum		Pause mode	
Heat flow (watt)			6000		1500		–	
Hot air throughput without backpressure (kg/h) with hood 90 mm			285		80		60	
Fuel consumption (l/h)			0.74		0.16		–	
Average electrical power consumption (watt)			12 V	24 V	12 V	24 V	12 V	24 V
		during operation	12 V: 90 24 V: 95		12 V: 7 24 V: 11		12 V: 6 24 V: 9	
		while starting	12 V: ≤ 90 24 V: ≤ 85					
Closed-circuit power consumption			100 µA					
Rated voltage			12 volt or 24 volt					
Operating range Lower voltage limit: Undervoltage protection installed in the control box switches off the heater on reaching the voltage limit*).			approx. 10.5 volt or approx. 21 volt Undervoltage protection response time: 20 seconds ±1					
Upper voltage limit: Overvoltage protection installed in the control box switches off the heater on reaching the voltage limit.			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. 7 kg					
Ventilation mode			possible					

*) The undervoltage limits of the heater must be taken into consideration in the use and design of a battery management system. An installed battery management system may only switch off the heater's power supply below the voltage limits if the response time of 20 seconds ±1 second is taken into consideration.

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.

3.1.5 Airtronic XL3 D8L

Heater type			Airtronic XL3		
Version			D8L		
Heating medium			Air		
Fuel			Diesel – standard commercially available (EN 590)		
Control of the heat flow			Maximum	Minimum	Pause mode
Heat flow (watt)			7600	2000	–
Hot air throughput without backpressure (kg/h) with hood 100 mm			335	100	60
Fuel consumption (l/h)			0.963	0.235	–
Average electrical power consumption (watt)		during operation	140	8	7
		while starting	≤ 90		
Closed-circuit power consumption			100 µA		
Rated voltage			24 volt		
Operating range Lower voltage limit: Undervoltage protection installed in the control box switches off the heater on reaching the voltage limit*).			approx. 21 volt Undervoltage protection response time: 20 seconds ±1		
Upper voltage limit: Overvoltage protection installed in the control box switches off the heater on reaching the voltage limit.			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. 8.5 kg		
Ventilation mode			possible		

*) The undervoltage limits of the heater must be taken into consideration in the use and design of a battery management system. An installed battery management system may only switch off the heater's power supply below the voltage limits if the response time of 20 seconds ±1 second is taken into consideration.

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.

3.2 Technical data for petrol heaters

3.2.1 Airtronic S3 B2L

Heater type			Airtronic S3		
Version			B2L		
Heating medium			Air		
Fuel			Petrol – standard commercially available (DIN EN 228)		
Control of the heat flow			Maximum	Minimum	Pause mode
Heat flow (watt)			2000	1000	–
Hot air throughput without backpressure (kg/h) with hood 75 mm			100	65	20
Fuel consumption (l/h)			0.26	0.14	–
Average electrical power consumption (watt)		during operation	26	11	4
		while starting	≤ 80		
Closed-circuit power consumption			100 µA		
Rated voltage			12 volt		
Operating range Lower voltage limit: Undervoltage protection installed in the control box switches off the heater on reaching the voltage limit*).			approx. 10.5 volt Undervoltage protection response time: 20 seconds ±1		
Upper voltage limit: Overvoltage protection installed in the control box switches off the heater on reaching the voltage limit.			approx. 16 volt Overvoltage protection response time: 20 seconds ±1		
Ambient temperature	Heater	during operation	-40 °C to +50 °C		
		not in operation	-40 °C to +85 °C		
	Metering pump	during operation	-40 °C to +20 °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. 2.5 kg		
Ventilation mode			possible		

*) The undervoltage limits of the heater must be taken into consideration in the use and design of a battery management system. An installed battery management system may only switch off the heater's power supply below the voltage limits if the response time of 20 seconds ±1 second is taken into consideration.

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.

3.2.2 Airtronic M3 B4L

Heater type			Airtronic M3		
Version			B4L		
Heating medium			Air		
Fuel			Petrol – standard commercially available (DIN EN 228)		
Control of the heat flow			Maximum	Minimum	Pause mode
Heat flow (watt)			4000	1300	–
Hot air throughput without backpressure (kg/h) with hood 90 mm			185	80	35
Fuel consumption (l/h)			0.55	0.17	–
Average electrical power consumption (watt)		during operation	38	8	4
		while starting	≤ 105		
Closed-circuit power consumption			100 µA		
Rated voltage			12 volt		
Operating range Lower voltage limit: Undervoltage protection installed in the control box switches off the heater on reaching the voltage limit*).			approx. 10.5 volt Undervoltage protection response time: 20 seconds ±1		
Upper voltage limit: Overvoltage protection installed in the control box switches off the heater on reaching the voltage limit.			approx. 16 volt Overvoltage protection response time: 20 seconds ±1		
Ambient temperature	Heater	during operation	-40 °C to +50 °C		
		not in operation	-40 °C to +85 °C		
	Metering pump	during operation	-40 °C to +20 °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. 4.5 kg		
Ventilation mode			possible		

*) The undervoltage limits of the heater must be taken into consideration in the use and design of a battery management system. An installed battery management system may only switch off the heater's power supply below the voltage limits if the response time of 20 seconds ±1 second is taken into consideration.

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.

3.2.3 Airtronic M3 B4R

Heater type			Airtronic M3		
Version			B4R		
Heating medium			Air		
Fuel			Petrol – standard commercially available (DIN EN 228)		
Control of the heat flow			Maximum	Minimum	Pause mode
Heat flow (watt)			4000	1300	–
Hot air throughput without backpressure (kg/h) with hood 90 mm			190	85	37
Fuel consumption (l/h)			0.55	0.17	–
Average electrical power consumption (watt)		during operation	54	10	5
		while starting	≤ 110		
Closed-circuit power consumption			100 µA		
Rated voltage			12 volt		
Operating range Lower voltage limit: Undervoltage protection installed in the control box switches off the heater on the voltage limit *).			approx. 10.5 volt Undervoltage protection response time: 20 seconds ±1		
Upper voltage limit: Overvoltage protection installed in the control box switches off the heater on reaching the voltage limit.			approx. 16 volt Overvoltage protection response time: 20 seconds ±1		
Ambient temperature	Heater	during operation	-40 °C to +50 °C		
		not in operation	-40 °C to +85 °C		
	Metering pump	during operation	-40 °C to +20 °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. 4.5 kg		
Ventilation mode			possible		

*) The undervoltage limits of the heater must be taken into consideration in the use and design of a battery management system. An installed battery management system may only switch off the heater's power supply below the voltage limits if the response time of 20 seconds ±1 second is taken into consideration.

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.

3.3 Control values

3.3.1 Resistance values

Resistance values at 20 °C	**12 volt**	**24 volt**
Glow plug	0.42 Ω – 0.62 Ω	1.2 Ω – 1.92 Ω
Airtronic S/M3 metering pump	9.5 Ω ±5%	36.0 Ω ±5%
Airtronic S/M3 VDP metering pump	4.5 Ω ±5%	
Airtronic L3 metering pump	9.5 Ω ±5%	36.0 Ω ±5%
Airtronic L3 VDP metering pump	4.5 Ω ±5%	
Airtronic XL3 metering pump		20.4 Ω ±5%

Control unit resistance values	**Switch position**		
	Left stop	Right stop	Ventilate
Mini controller (12 volt / 24 volt)	min. 1730 Ω max. 1780 Ω	min. 2120 Ω max. 2240 Ω	1200 Ω

3.3.2 Exhaust value

CO_2 in the exhaust

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

Bacharach soot number: < 4

3.3.3 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.

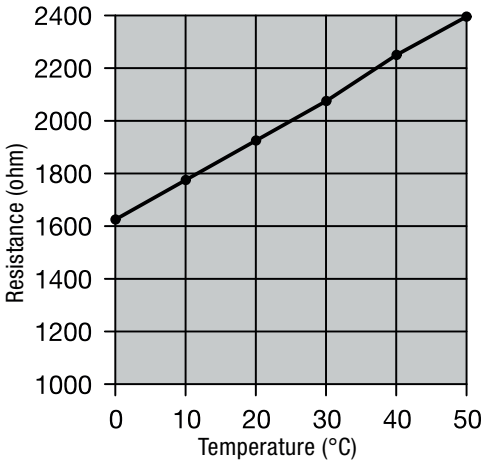


Table of values – “External” temperature sensor

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?
- 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 XB10 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 a diagnostic unit / control unit. For the procedure and description for diagnostic units and control units, see “Installation Instructions Plus – EasyStart / Altitude Kit / Special Functions and Diagnosis”.

4.4 Overview of the diagnostic units 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 diagnostic units 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:

Diagnostic unit	**Order No.:**
▪ EasyScan	22.1550.89.0000

The following control units can also be used for the diagnosis:

Control units	**Order No.:**
▪ EasyStart Remote+	22.1000.34.1700*
▪ Easy Start Pro	22.1000.35.2200**
▪ EasyStart Web (up to 2018)	22.1000.34.5100*
▪ EasyStart Web (from 2019)	22.1000.34.7800*
▪ EasyStart Web (from 2021)	22.1000.35.3500**

*) Not available for North America
**) For North America, refer to NA Product Catalogue

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 Installation Instructions ES Pro

4.5.2 EasyStart Web

Note

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

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.

To read out the heater error, see Installation Instructions Remote+ or Installation Instructions Plus.

***) Not applicable for North America

4.6 Flashing code display

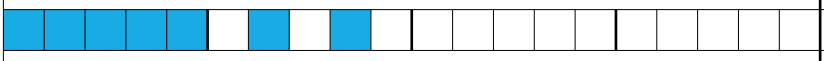
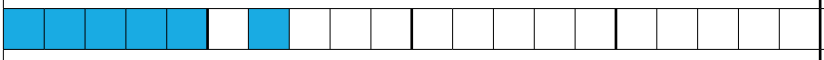
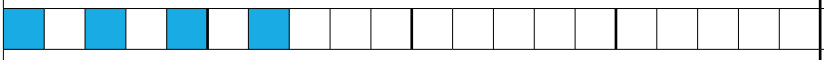
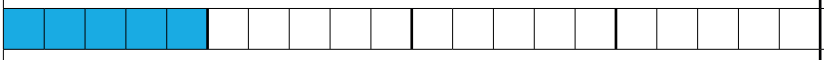
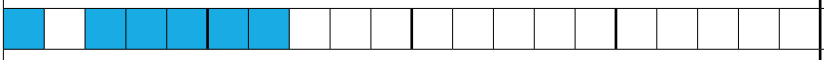
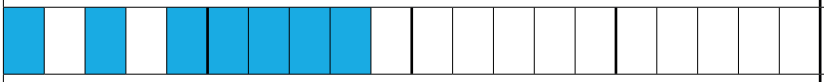
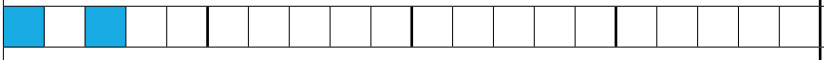
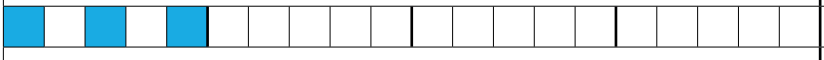
4.6.1 Function display and error output via flashing code

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	**Fault class** For TP7.1 control units: ▪ 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 the resistance between cable BN (chamber 3) and cable WH (chamber 6). – Measured values see page 34, in case of deviating values –> replace temperature sensor.	**1**: Service
P000110 (087) **P000111** (088) **P000112** (089)	Air inlet sensor – Interruption – Short circuit – Short circuit to battery (+)	▪ Check the air inlet sensor for damage – in case of visible damage –> replace the temperature sensor – Unplug connector XB2, measure the resistance between cable BK (chamber 1) and BK (chamber 4) – For measured values - see page 34 ▪ Delete fault memory. – If the error continues to be displayed –> replace the temperature sensor.	**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 no –> 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 the resistance between cable BU (chamber 2) and cable BN (chamber 3). – Measured values see page 34, in case of deviating values –> replace temperature sensor.	**1**: Service
P000115 (012)	Overheating – Software threshold exceeded	▪ Check air throughput ▪ Check overheating sensor – Check cables for continuity, short circuit and damage. – Unplug connector XB2, measure the resistance between cable BN (chamber 3) and cable WH (chamber 6). – Measured values see page 34, in case of deviating values –> replace temperature sensor.	**5**: Air system or air outlet

Fault code **P000…** for EasyScan and TP 7.1 (if connected via CAN) **(…)** for TP 7 (LIN)	**Error description**	**Cause** ▪ Remedial action	**Fault class** For TP7.1 control units: ▪ EasyStart Web ▪ EasyStart Pro
P000116 (017)	Overheating – Hardware threshold exceeded	Temperature at overheating sensor >150 °C ▪ For remedial action, see Fault code P000115 (012). ▪ Check overheating sensor. – Check cables for continuity, short circuit and damage. – Unplug connector XB2, measure the resistance between cable BN (chamber 3) and cable WH (chamber 6). – Measured values see page 34, in case of deviating values –> replace temperature sensor.	**5**: Air system or air outlet
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. 18.	**6**: Overheating, heater is blocked
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 the resistance between cable BU (chamber 2) and cable BN (chamber 3). – Measured values see page 34, in case of deviating values –> replace the temperature sensor. ▪ Further display Fault code P000120 (064) and Fault code P000121 (065) –> replace the control box, see Chapter 5.4.2, p. 30.	**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. 42. ▪ Check flame sensor, see Fault code P000120 (064) and Fault code P000121 (065).	**1**: Service

Fault code **P000…** for EasyScan and TP 7.1 (if connected via CAN) **(…)** for TP 7 (LIN)	**Error description**	**Cause** ▪ Remedial action	**Fault class** For TP7.1 control units: ▪ EasyStart Web ▪ EasyStart Pro
P00012A (052)	Unsuccessful starting process	▪ Check exhaust and combustion air system. ▪ Check fuel quantity and fuel supply, see Chapter 5.6, p. 42. ▪ Check the fuel filter or fuel strainer in the metering pump, renew if necessary.	**4**: Fuel supply or fuel pump
P00012B (050)	Operating lockout, too many unsuccessful starting processes	Following 10 unsuccessful start attempts the control box is locked. ▪ Unlock control box, see Chapter 4.3, p. 18.. ▪ Check fuel quantity and fuel supply, see Chapter 5.6, p. 42.	**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 temperature sensor and measure the resistance value, diagram and table of values see page 17, – if temperature sensor is ok, re-connect the GYRD / BNWH plug-in connection. ▪ Disconnect connector XS10/XB10 at the heater and measure the resistance value between PIN 5 GRRD and PIN 6 BNWH in connector housing XB10. – In the event of interruption/damage, the ohmic resistance value is outside the characteristic (for table, see on page 17). ▪ If the error continues to be displayed, test the connection to connector XS12/XB12. ▪ If resistance value is ok –> replace control box.	**7**: Emergency running
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 17, – if ok, re-connect the GYRD / BNWH plug-in connection. ▪ Disconnect connector XS10/XB10 at the heater and measure the resistance value between PIN 5 GRRD and PIN 6 BNWH in connector housing XB10. – In the event of interruption/damage, the ohmic resistance value is outside the characteristic (for table, see on page 17). ▪ If the error continues to be displayed, test the connection to connector XS12/XB12. ▪ If the error P000131 (061) continues to be displayed –> replace control box.	**7**: Emergency running
P000143 (006)	Air pressure sensor – Implausible signal	▪ Delete error and try again. ▪ If error occurs again, replace control box.	**7**: Emergency running

Fault code **P000…** for EasyScan and TP 7.1 (if connected via CAN) **(…)** for TP 7 (LIN)	**Error description**	**Cause** ▪ Remedial action	**Fault class** For TP7.1 control units: ▪ EasyStart Web ▪ EasyStart Pro
P000150 **P000151** **P000152**	Circuit board temperature sensor in the control box – defective (voltage too high) – defective (voltage too low) – Overtemperature detected	▪ Delete error and try again. ▪ Replace control box, see Chapter 5.4.2, p. 30	**1**: Service
P000160 **P000161** **P000162**	Setpoint transmitter (e.g. mini controller) – Interruption – Short circuit – Short circuit to battery (+)	▪ Check the setpoint transmitter (e.g. mini controller) ▪ Disconnect plug-in connection GYRD / BNWH of the setpoint transmitter (e.g. mini controller). The mini controller must be supplied with voltage and the heating switched on to enable a resistance to be measured. Therefore: – Disconnect the plug-in connection GYRD / BNWH to the mini controller, switch on mini controller “Heat” and measure the resistance value, – 12V: 1,7 kohm (cold) up to 2.2 kohm (warm) --> equals the nominal value ▪ Disconnect plug-in connection XS10 / XB10 and measure the continuity of the GYRD / BNWH cable between connector XB10 and plug-in connection to the mini controller. – In the event of cable harness interruption/damage, replace or repair. ▪ If the error continues to be displayed, test the connection to connector XS10/XB10. ▪ If resistance value is ok –> replace control box.	**7**: Emergency running
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 fuel pump
P000202 (049)	Metering pump – Short circuit to battery (+) or transistor error	▪ Check cables for continuity, short circuit and damage. **Note** Disconnect the connector at the metering pump for the cable test ▪ With metering pump disconnected, check whether error P00202 continues to occur. If yes –> replace the cable harness. If not –> replace the metering pump. ▪ Display Fault code P000200 (048) metering pump defective –> replace metering pump.	**4**: Fuel supply or fuel pump

Fault code **P000…** for EasyScan and TP 7.1 (if connected via CAN) **(…)** for TP 7 (LIN)	**Error description**	**Cause** ▪ Remedial action	**Fault class** For TP7.1 control units: ▪ 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** A voltage > 9.5 V (19 V for 24 V) irreparably damages the glow plug. → Test the function with max. 9.5 V (19 V for 24 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 -XB13, unclip cable WH (chamber 1) and cable BN (chamber 3). – For 12 V heater: Apply 9.5 V ±0.1 volt voltage to the glow plug and measure the current intensity after 25 seconds. – If measured value is 9.5 A (+1 / –1.5) the glow plug is ok. – In case of deviating values –> replace the glow plug. – For 24 V heater: Apply 19 V ±0.1 volt voltage to the glow plug and measure the current intensity after 25 seconds. – If measured value is 5.1 A (+1 / –1.5) the glow plug is ok. – In case of deviating values –> replace the 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. ▪ Check glow plug, see Fault code P000210 (020) to Fault code P000212 (022).	**1**: Service
P000220 **P000221** **P000222**	Burner motor – Interruption – Short circuit – Short circuit downstream of +Ub or transistor fault	▪ Visual inspection of electric motor / control box (contacting). ▪ Check the electric motor for dirt / corrosion, clean if necessary. ▪ Check the impeller for blockage, remove the blockage if necessary. ▪ Renew the burner motor if necessary.	**1**: Service
P000223 (033) **P000224** (035)	Burner motor – Blocking – Power input too high	Impeller blocked (frozen, soiled, sluggish, ...). ▪ Remove blockage. – Check the burner motor for smooth and easy running by turning the impeller manually. Further display Fault code P000222 ▪ Renew fan, see Chapter 5.4.10, p. 35.	**1**: Service
P000260 **P000261** **P000262**	Switch output – Interruption – Short circuit – Short circuit to battery (+) or transistor error	Test the switch output. ▪ Test WHRD conductor for continuity, short circuit and damage. ▪ If cable ok –> replace control box. ▪ Option: Delete errors and switch on the heater. If the error occurs again –> replace the 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	**Fault class** For TP7.1 control units: ▪ EasyStart Web ▪ EasyStart Pro
P000280 **P000281** **P000282**	Switch output (e.g. in configuration as fresh air damper) – Interruption – Short circuit to ground – Short circuit to battery (+) or transistor error	Test the switch output. ▪ Test WHRD conductor for continuity, short circuit and damage. ▪ If cable ok –> replace control box. ▪ Option: Delete errors and switch on the heater. If the error occurs again –> replace the control box	**1**: Service
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 XB2, measure the resistance between cable WH (chamber 6) and cable BN (chamber 3). – Measured values see page 34, in case of deviating values –> renew combination sensor. ▪ Further display Fault code P000300 (074) –> replace the control box. ▪ Unlock control box, see Chapter 4.3, p. 18..	**1**: Service
P000301 (090) **P000302** (090)	Watchdog reset Internal error on initialising the control box Too many watchdog resets	▪ Delete errors, the heater remains ready for operation. ▪ Test the power supply (voltage drops < 5 V and longer than 10 ms or < 8 V and longer than 10 ms, battery isolating switch, battery management system) ▪ Replace control box, see Chapter 5.4.2, p. 30	**1**: Service
P000303 (099)	Operating lockout: Too frequent output stage errors	▪ Replace control box, see Chapter 5.4.2, p. 30	**1**: Service
P000304 (091)	Too many resets (loose contact)	▪ Replace control box, see Chapter 5.4.2, p. 30	**1**: Service
P000305 (095)	Control box not calibrated	▪ Replace control box, see Chapter 5.4.2, p. 30	**1**: Service
P000306 (098)	Second cutout circuit is defective	▪ Replace control box, see Chapter 5.4.2, p. 30	**1**: Service
P000307 (081)	CAN communication error in control unit	▪ Delete errors and disconnect heater from the power supply. ▪ In the event of renewed occurrence of the error –> Test the control unit, test the cables to the control unit.	**1**: Service
P00030A	CAN communication error	Delete error. Heater remains ready for operation.	**1**: Service
P000310/1 (010)	Control box cutout due to overvoltage **Note!** Heater is not functioning.	Overvoltage applied at the control box without interruption for at least 20 seconds (factory setting). ▪ Unplug connector -XB10 at the heater. ▪ Start the vehicle engine. ▪ Measure voltage between cable RD (chamber 4) and cable BN (chamber 2). – Airtronic 12 volt voltage > 16 V (factory setting) –> test the generator controller – Airtronic 24 volt voltage > 32 V (factory setting) –> test the generator controller – Check the battery.	**3**: Overvoltage

Fault code **P000…** for EasyScan and TP 7.1 (if connected via CAN) **(…)** for TP 7 (LIN)	**Error description**	**Cause** ▪ Remedial action	**Fault class** For TP7.1 control units: ▪ EasyStart Web ▪ EasyStart Pro
P000312/3 (011)	Control box cutout due to undervoltage **Note!** Heater is not functioning.	Undervoltage applied at the control box without interruption for at least 20 seconds (factory setting). ▪ Unplug connector -XB10 at the heater. ▪ Measure voltage between cable RD (chamber 4) and cable BN (chamber 2). – Airtronic 12 volt voltage < 10 V (factory setting) –> test the generator controller – Airtronic 24 volt voltage < 21 V (factory setting) –> test the 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. 30	**1**: Service
P000331 (093)	RAM error	▪ Replace control box, see Chapter 5.4.2, p. 30	**1**: Service
P000332 (094)	NVMEM error (EEPROM, DataFlash)	▪ Replace control box, see Chapter 5.4.2, p. 30	**1**: Service
P000333	AD converter error	▪ Replace control box, see Chapter 5.4.2, p. 30	**1**: Service
P000342	Invalid configuration	▪ Impermissible combination of the Eberspächer products in the CAN system – too many CAN heaters (more than 2) – too many CAN control units (more than 2) – only 1 heater and 1 control unit allowed for ADR ▪ In the ADR case, check the ADR coding in the EasyStart Pro via EasyScan ▪ If necessary, check the connection to the control element. ▪ If the error only appears in the error memory (passive), it can be ignored and deleted as it does not restrict the function of the heater.	**1**: Service
P000343	Parameter dataset is incompatible	▪ Replace control box, see Chapter 5.4.2, p. 30	**1**: Service
P000394	ADR button – Short circuit	▪ Test ADR button. – Check the cables at GYRD / BNWH for continuity, short-circuit and damage. – Check the button 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. ▪ In the event of renewed occurrence of the error –> Test the control unit, test the cables to the control unit. ▪ If error occurs again –> replace control unit.	**0**: No message
P000441	Timeout during communication with LIN control unit (only CI-bus communication)	▪ Delete errors and disconnect heater from the power supply. ▪ In the event of renewed occurrence of the error –> Test the control unit, test the cables to the control unit.	**0**: No message
P000450	LIN communication error (only CI-bus communication)	▪ Delete errors and disconnect heater from the power supply. ▪ In the event of renewed occurrence of the error –> Test the control unit, test the cables to the control unit.	**0**: No message

5 Repair instructions

This chapter describes the permitted repair work on the heater.

Before starting the repair work, always dismantle the hot air intake hose and the hot air hose at the heater.
If necessary, remove the heater from the vehicle to carry out repair work.

Assembly of the heater is described from page 37.

Danger!

Risk of injury, burns and poisoning!

Ensure the following before carrying out any work on the heater:

→ Switch off the heater and leave it to cool.
→ Disconnect the battery.
→ Do not operate the heater in enclosed spaces (garage / workshop).
Exception: Existing exhaust extraction available directly at the entry to the exhaust pipe.

Caution!

Damage to the unit

→ Always renew the seals and O-rings of dismantled components.
→ Check all components for damage and replace if necessary.
→ Check plug-in contacts, plug-in connections and cables for corrosion and damage, and repair if necessary.
→ Only use original Eberspächer spare parts.
→ Operation and after running of the heater may only be stopped in an emergency (see “EMERGENCY STOP” on page 6) by interrupting the battery current (risk of heater overheating).

Note!

Thread-forming screws are used to fix the components in the factory. In case of repair the thread is already pre-cut by the initial installation.

Installation instructions

- Position screw by hand and screw in.
  – Always keep to the given tightening torque.
- When screwing for the second time also position by hand and do not cut a new thread.
- The screw is suitable for max. 6 installation attempts.

Note!

After completing all the work and installing the heater in the vehicle, carry out a functional check on the heater.

5.1 Special tool

5.1.1 Release tool*

An AMP / Molex release tool is used to unlock plug-in contacts. This can be ordered directly from AMP or Molex.

- Junior Power timer — AMP Order No. 1-1579007-6
- MCP series — AMP Order No. 1-1579007-2
- Micro-Timer — AMP Order No. 0-0539960-1
- Micro-Fit — Molex Order No. 11-03-0043
- FastIn-FastOn — AMP Order No. 1-1579007-4

*) For North America, refer to NA Product Catalogue

5.2 Repair steps

Note!

Basically, in the repair steps it is assumed that a defective component is removed and a new or functioning old component is installed. The description of the repair therefore omits the name “new”.

Remove / install control box
- Chapter 5.4.2, p. 30
- Chapter 5.5.8, p. 40

Remove / install glow plug
- Chapter 5.4.4, p. 31
- Chapter 5.5.5, p. 39

Remove / install heater
- Chapter 5.4.5, p. 32
- Chapter 5.5.12, p. 41

Remove / install outlet hood
- Chapter 5.4.6, p. 32
- Chapter 5.5.10, p. 41

Remove / install bottom jacket shell
- Chapter 5.4.7, p. 32
- Chapter 5.5.9, p. 41

Remove / install combination sensor
- Chapter 5.4.9, p. 33
- Chapter 5.5.4, p. 38

Check combination sensor
- Chapter 5.4.8, p. 32

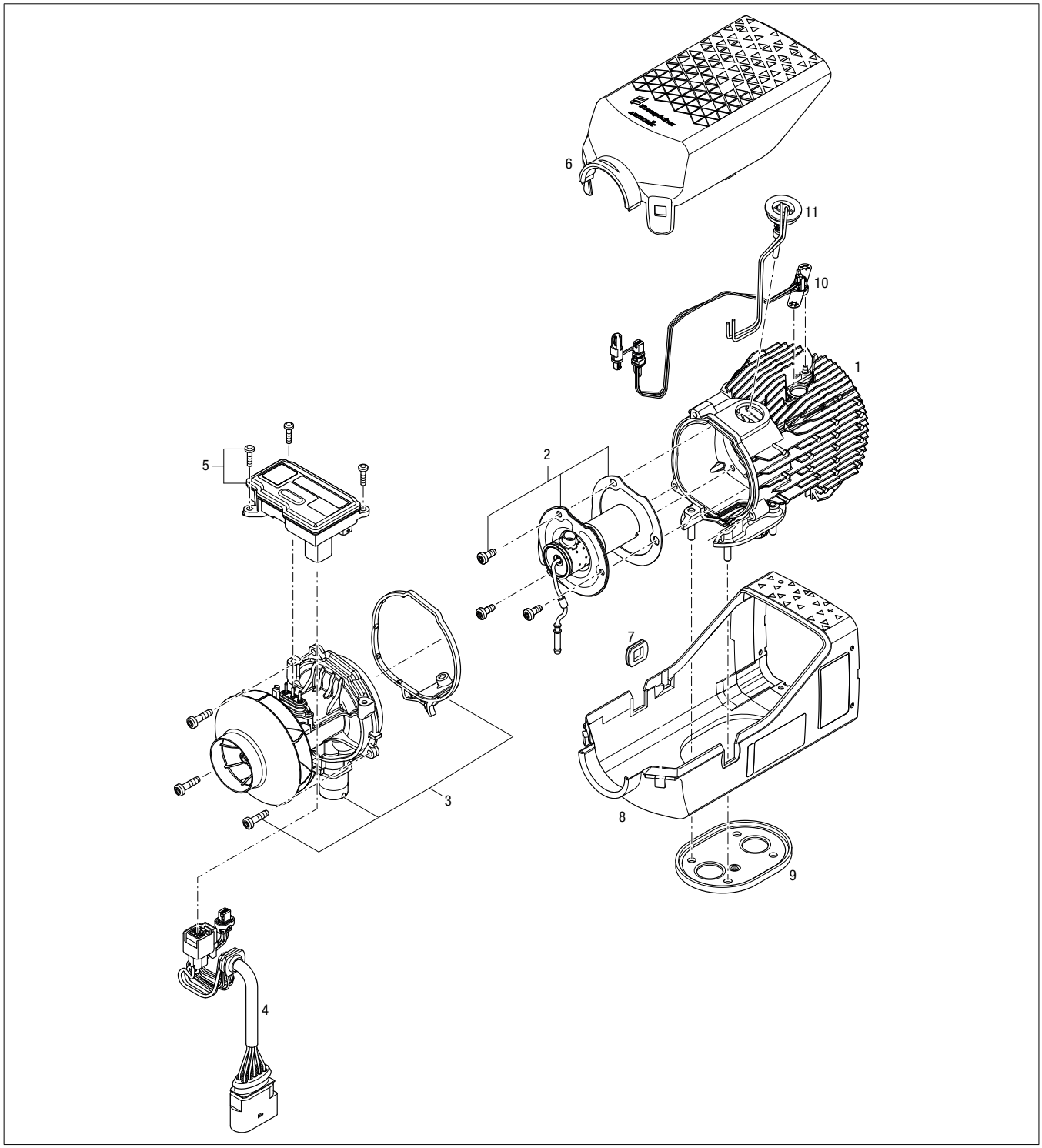
Remove / install fan
- Chapter 5.4.10, p. 35
- Chapter 5.5.3, p. 38

Remove / install combustion chamber
- Chapter 5.4.11, p. 35
- Chapter 5.5.2, p. 37

Remove / install heat exchanger
- Chapter 5.4.12, p. 36
- Chapter 5.5.1, p. 37

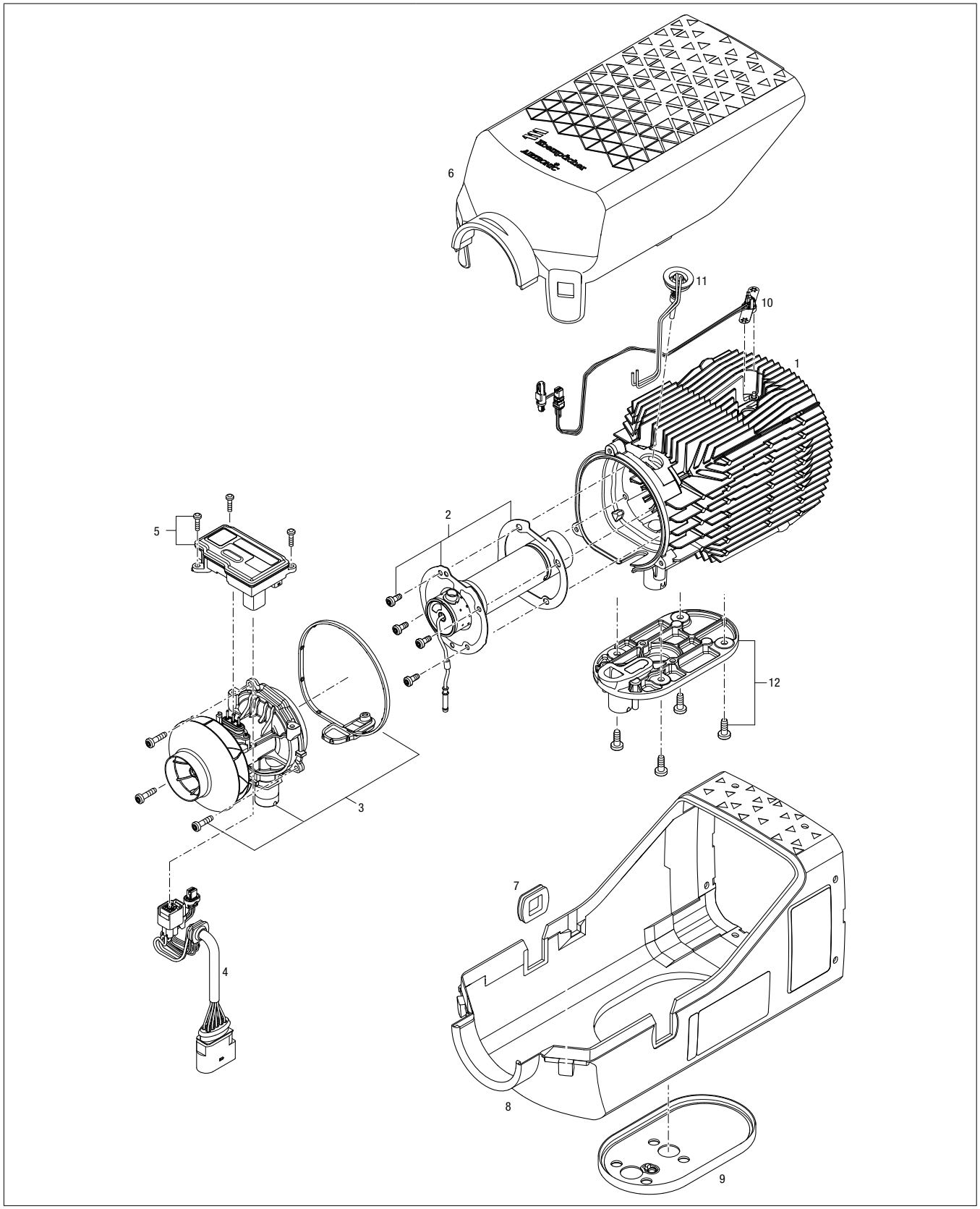
5.3 Exploded drawing of heater

5.3.1 Airtronic S3, Airtronic M3



1 Heat exchanger
2 Combustion chamber / thermal separation
3 Fan / heat exchanger seal
4 Cable harness heater
5 Control box
6 Jacket shell, top
7 Rubber grommet
8 Jacket shell, bottom
9 Airtronic 3 S, M flange seal
10 Overheating / flame sensor
11 Glow plug

5.3.2 Airtronic L3, Airtronic XL3



1 Heat exchanger
2 Combustion chamber / thermal separation
3 Fan / heat exchanger seal
4 Cable harness heater
5 Control box
6 Jacket shell, top
7 Rubber grommet
8 Jacket shell, bottom
9 Flange seal
10 Overheating / flame sensor
11 Glow plug
12 Heat exchanger base

5.4 Dismantle the heater

Note!

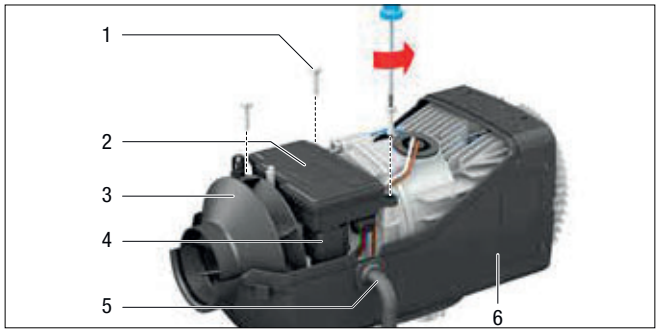
- Unless stated otherwise, the figures show the Airtronic S3.
- Before starting the repair work, dismantle the hot air intake hose at the heater.
- The repair step 5.4.1 must be carried out for all repair work.
- Before removing the heater (step 5.4.1), dismantle the hot air hose from the outlet hood.

1 Jacket shell, top
2 Latch fastener

5.4.1 Removing the upper jacket shell

- Unlock both latch fasteners [2], lift the upper jacket shell [1] and pull off in the direction of the arrow.

Next possible repair step:
Remove control box, see step 5.4.2



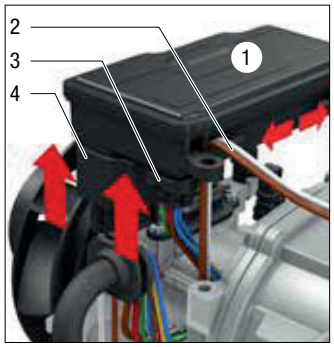
1 Fixing screws M4 × 16 (Torx)
2 Control box
3 Fan motor
4 Connector, control box
5 Lead harness
6 Jacket shell, bottom

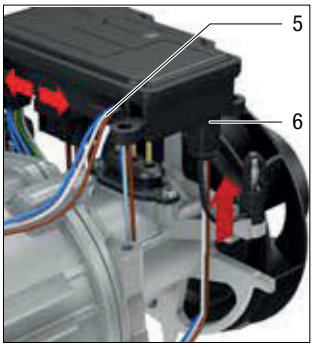
5.4.2 Removing the control box

- Unscrew 3 fixing screws of the control box [1].
- Pull the lead harness [5] with grommet out of the bottom jacket shell [6] from above.

Note!

Please note that after replacing the control box, all existing codings, e.g. for ADR mode, etc. must be restored.





1 Control box
2 Glow plug lead harness
3 Connector, control box
4 Power supply connector and glow plug
5 Combination sensor lead harness
6 Temperature sensor connector and combination sensor

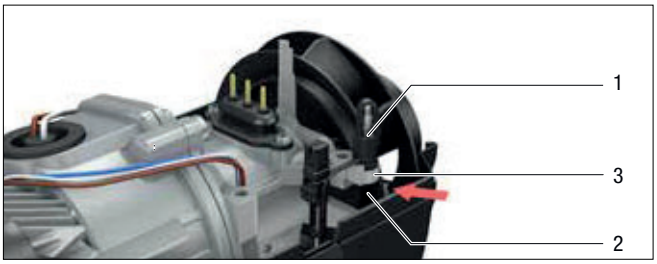
- Push the lead harness of the glow plug [2] and of the combination sensor [5] inwards out of the cable guides.
- Pull the control box [1] off the base of the fan motor from above.

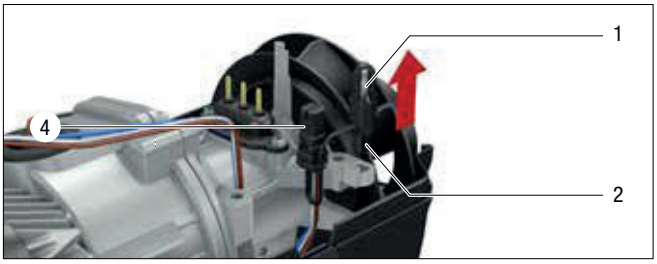
Note!

Some connectors on the control box are equipped with locking functions and cannot be simply pulled off.

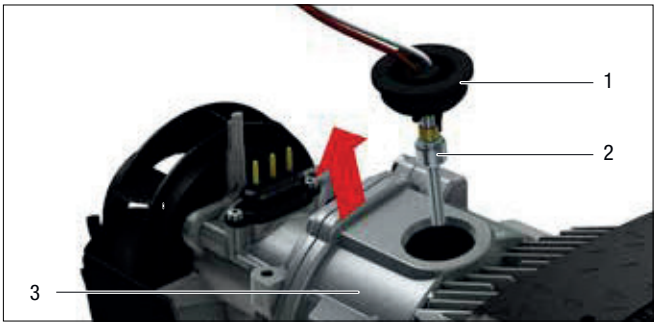
- The connector for power supply and glow plug [4] has a locking tab on the side which has to be pressed towards the inside. If pulled out the same time, the connector is released from the bush and can be pulled off.
- Press together the connector for the control box [3] at the front sides to unlock it and then pull it off.
- Pull off the connector for the temperature sensor and the combination sensor [6].

Next possible repair step:
Dismantle the temperature sensor, see step 5.4.3





1 Temperature sensor
2 Plastic tabs
3 Temperature sensor bracket
4 Temperature sensor connector and combination sensor



1 Rubber grommet, glow plug
2 Glow plug
3 Heat exchanger

5.4.3 Dismantle the temperature sensor

- Remove the temperature sensor [1] from its bracket.
- To do so, use pointed nose pliers to lightly push together the plastic tabs [2] under the bracket [3] and push out the sensor upwards.
- Remove the connector of the temperature sensor and combination sensor [4] from above.

Note!

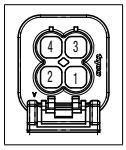
If replacement is necessary, due to the joint pin assignment, the temperature sensor can only be replaced together with the combination sensor.

Next possible repair step:
Dismantle the glow plug, see step 5.4.4

5.4.4 Removing the glow plug

- Carry out step 5.4.1 and step 5.4.2.
- Unpin the two glow plug connection cables from chamber 1 (WH) and chamber 3 (BN) of the power supply and glow plug connector using the AMP tool 1-1579007-4.*

*) For North America, refer to NA Product Catalogue



Connector shown from the cable inlet side.

Note!

It is not necessary to unpin the connection cables from the connector for a mere visual inspection of the glow plug.

- Pull off the rubber grommet [1] of the glow plug at the heat exchanger [3] and pull out the glow plug [2].

Note!

Dismantle the rubber grommet by hand if possible and do not use sharp-edged tools, as otherwise the grommet could become damaged.

Warning!

Personal injuries and damage to the unit due to leaks

A damaged rubber grommet leads to leaks and can lead to personal injuries and malfunctioning or damage to the heater.

→ Do not damage the rubber grommet when dismantling it.
→ Do not reuse damaged rubber grommet.

Next possible repair step:
Dismantle the heater, see step 5.4.5

5.4.5 Removing the heater

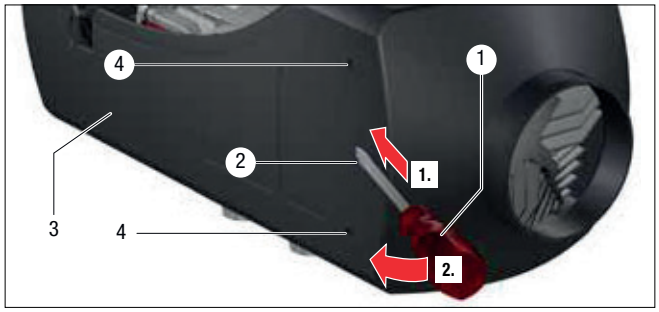
The heater must be dismantled from the vehicle for steps 5.4.6 to 5.4.11.

- Remove fuel connection.
- Remove combustion air hose.
- Remove exhaust pipe.
- Unscrew the fixing screws at the unit flange.
- Undo the clamp on the outlet hood, pull off the hot air hose and remove the heater from the vehicle.

Note!

If there is sufficient space around the heater in the place of installation, the outlet hood can also be removed without dismantling the hot air hose from the lower jacket shell, see step 5.4.6

5.4.6 Removing the outlet hood

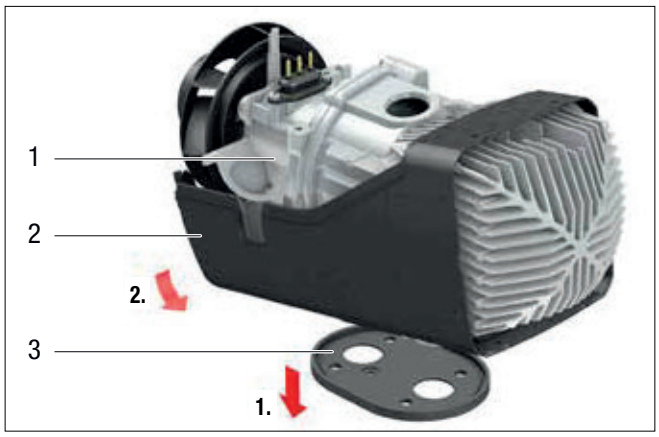


1 Flathead screwdriver
2 Recess in the jacket shell
3 Jacket shell, bottom
4 Snap connector

- Carry out step 5.4.1 and step 5.4.5.
- 1. Insert a flat-headed screwdriver [1] with wide blade vertically to the surface in the recess [2] of the jacket shell [3] and turn the hood to lift it off the jacket shell. At the same time, apply force in the axial direction.
- 2. Use the flathead screwdriver to bend up the jacket shell in the direction of the arrow until the snap connectors [4] release.
- Detach the outlet hood, with or without hot air hose, from the bottom jacket shell [3].

Next possible repair step:
Remove lower jacket shell, see step 5.4.7

5.4.7 Removing lower jacket shell

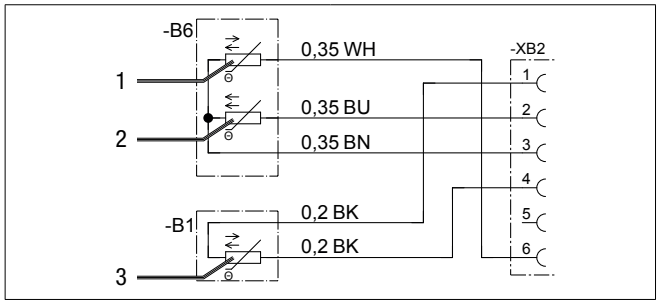


1 Heater
2 Jacket shell, bottom
3 Flange seal

- Carry out step 5.4.1 and step 5.4.6.
- Hold onto the heater [1] and lower jacket shell [2]
- 1. Pull off flange seal [3].
- 2. Fold the jacket shell downwards, remove it from the heater and place it to one side.

Next possible repair steps:
– Dismantle the combination sensor, see step 5.4.9
– Dismantle the fan, see step 5.4.8

5.4.8 Testing the combination sensor

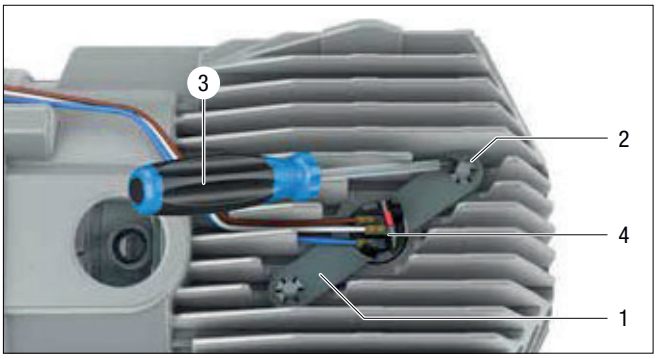


1 NTC overheating sensor 50 kΩ
2 PT 1000 flame sensor
3 Air inlet sensor

For the test with a digital multimeter, remove the combination sensor, see step 5.4.9.
Replace the combination sensor if the resistance values are not the same as the curves in the diagram or the table of values.

Note!

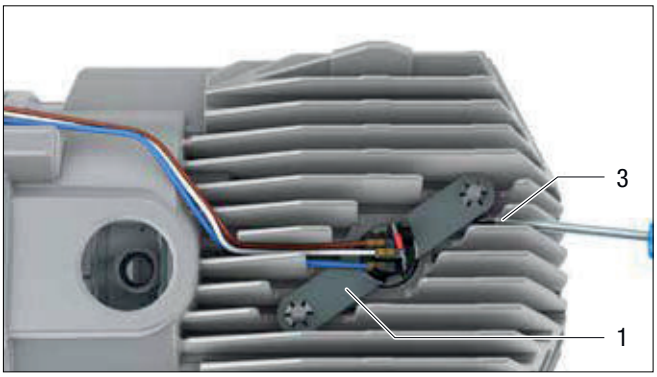
Note the maximum temperature 320 °C for the test.



1 Fastening tabs
2 Claws
3 Flathead screwdriver
4 Combination sensor

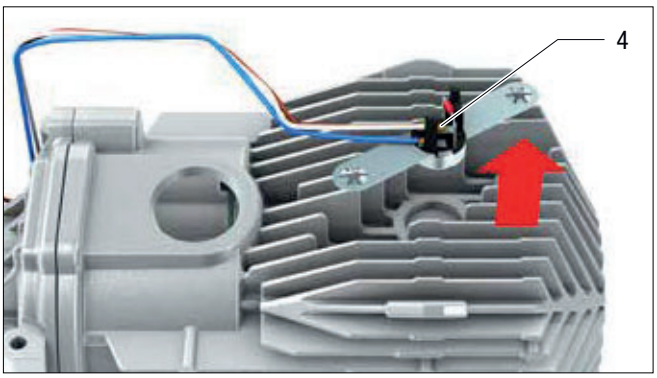
5.4.9 Removing the combination sensor

- Carry out step 5.4.1 to step 5.4.3 as well as step 5.4.5 to step 5.4.7.
- Position a flat-headed screwdriver [3] (2 mm wide blade) between two claws [2] at both fastening tabs [1] of the defective combination sensor [4]
- Bend upwards at least two claws of each tab.



1 Fastening tabs
3 Flathead screwdriver

- Push the released fastening tabs [1] upwards with the flat-headed screwdriver [3].

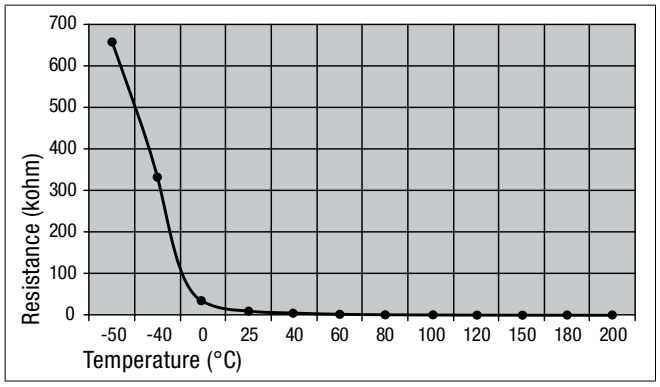


4 Combination sensor

- Remove the defective combination sensor [4].

Next possible repair steps:

– Install combination sensor, see step 5.5.4
– Remove fan, see step 5.4.10



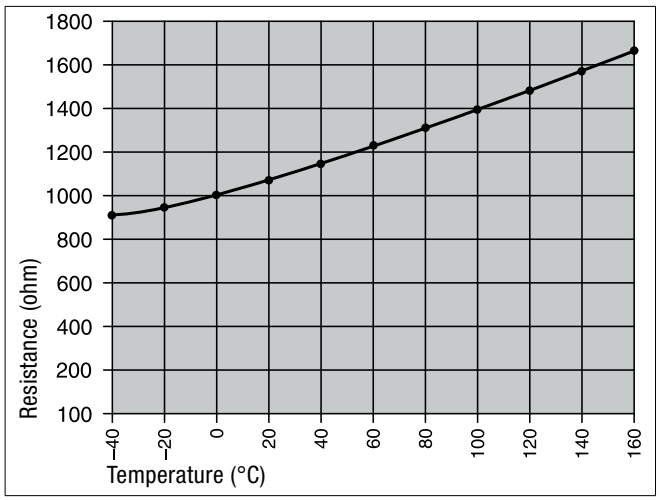
Testing the overheating sensor

Carry out step 5.4.1 to step 5.4.9.

To test the overheating sensor, measure the resistance in chambers 3 and 6 in connector -XB2.

Table of overheating sensor values

Temperature °C	Resistance kΩ	
	min.	max.
–50	577.00	737.00
–40	297.60	363.60
0	30.35	34.75
25	9.50	10.50
40	5.01	5.65
60	2.315	2.665
80	1.16	1.36
100	0.617	0.737
120	0.351	0.427
150	0.163	0.203
180	0.083	0.107
200	0.056	0.072

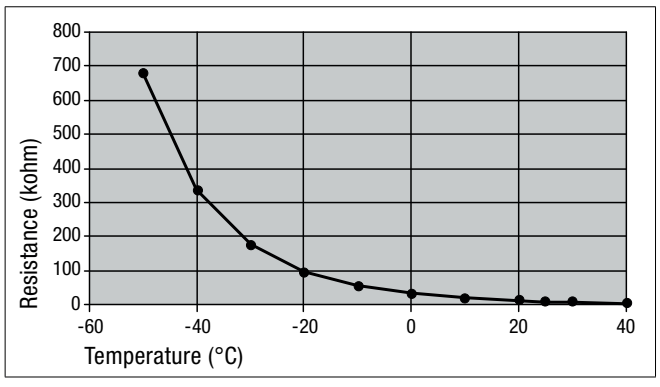


Check flame sensor

To test the flame sensor, measure the resistance in chambers 2 and 3 in connector -XB2.

Table of flame sensor values

Temperature °C	Resistance Ω		
	Setpoint	min.	max.
–40	843	826	860
–20	922	903	940
0	1000	980	1020
20	1078	1056	1100
40	1155	1132	1179.5
60	1232	1208	1257
80	1309	1283	1335
100	1385	1357	1413
120	1461	1432	1490
140	1536	1505	1567
160	1611	1578	1643

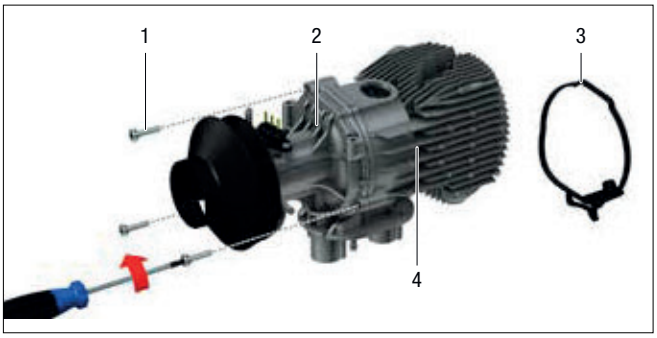


Test the air inlet sensor

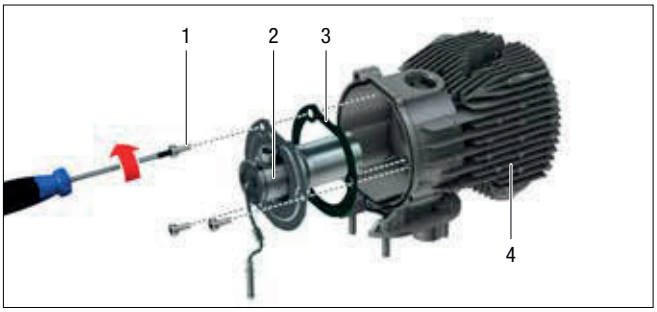
To test the air inlet sensor, measure the resistance in chambers 1 and 4 in connector -XB2.

Table of values - air inlet sensor

Temperature °C	Resistance kΩ		
	Setpoint	min.	max.
–50	678	643	714
–40	337	322	353
–30	177	170	184
–20	97	94	100
–10	55	54	57
0	33	32	33
10	20	20	20
20	13	12	13
25	10	10	10
30	8	8	8
40	5	5	5



1 Fixing screws M5 × 20 (Torx)
AL3 / AXL3: M5 × 25 (Torx)
2 Fan
3 Seal AS3 / AM3
4 Heat exchanger



1 Fixing screws M5 × 12 (Torx)
2 Combustion chamber
3 Thermal separation
4 Heat exchanger

5.4.10 Removing the fan

Note!

- A defective fan cannot be repaired. Replace the complete fan.
- The combustion air impeller is a sensitive, high-precision moulded and balanced component. Therefore, when dismantling / installing the fan, never put it down on the combustion air impeller or expose the impeller to mechanical loads. Put the fan down to the side only.

- Carry out step 5.4.1 to step 5.4.3 as well as step 5.4.5 to step 5.4.7.
- Unscrew the fixing screws [1] of the fan [2] at the heat exchanger [4].
- Remove the fan [2].

Note!

The inner seal of the fan [3] cannot be replaced until the combustion chamber has been dismantled, as it is connected to the grommet of the fuel connection. Then dispose of the fan seal according to the regulations.

Next possible repair step:
Remove combustion chamber, see step 5.4.11

5.4.11 Removing the combustion chamber

- Carry out step 5.4.1 to step 5.4.3 as well as step 5.4.5 to step 5.4.10.
- Unscrew the 3 fixing screws [1] of the combustion chamber [2] at the heat exchanger [4].

Note!

Airtronic M3, L3 and XL3: The combustion chamber is fixed with 4 screws. Undo all 4 screws.

- Pull the combustion chamber with fan seal, fuel connection and grommet out of the heat exchanger.
- Remove the thermal separation [3] between the combustion chamber and heat exchanger and dispose of in accordance with the regulations.

Note!

Airtronic L3 and XL3: The thermal separation between the combustion chamber and heat exchanger is dismantled together with the combustion chamber. To do so,

- 1. Unscrew 4 screws M5 × 15 in the baseplate of the heater.
- 2. Turn the baseplate to the right slightly to unthread the grommet of the fuel line.
- 3. remove the baseplate.

The combustion chamber is fixed with four screws.

5.4.12 Removing the heat exchanger

To dismantle or replace the heat exchanger, complete the steps “5.4.1 Removing upper jacket shell” to “5.4.4 Removing the glow plug”, “5.4.5 Removing the heater” to “5.4.9 Removing the combination sensor” as well as “5.4.10 Removing the fan” and “5.4.11 Removing the combustion chamber”.

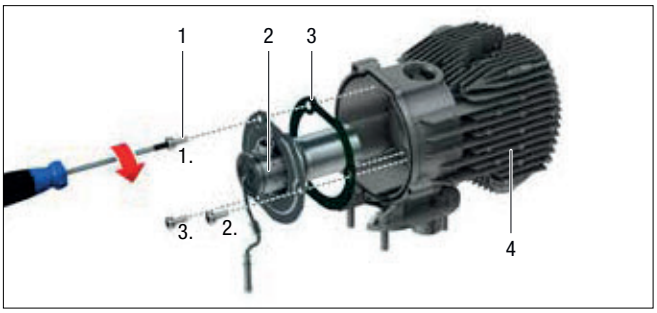
5.5 Assembling the heater

Note!

Damage to unit caused by third party, damaged or deformed components

Installing third party, damaged or deformed components has a negative effect on the function of the heater.

→ Replace damaged or deformed components.
→ Use original Eberspächer spare parts only, see spare parts list.
→ Use all the components included in spare parts kits.
→ Always renew the heat exchanger after a heater operating period of 10 years.
→ Always renew the seal between the combustion chamber and heat exchanger.



1 Fixing screws M5 × 12 (Torx)
2 Combustion chamber
3 Thermal separation of combustion chamber – heat exchanger
4 Heat exchanger

5.5.1 Installing the heat exchanger

- Before installing a used heat exchanger, check it for wear, damage or deformations.
- Check a new heat exchanger for transport or material damage.

5.5.2 Installing the combustion chamber

Note!

The heat exchanger is a component subjected to high thermal loads. Before installing the combustion chamber in a used heat exchanger, check it for wear and deformations and replace if necessary.

- Clean the sealing surfaces of the heat exchanger [4] and combustion chamber [2] to remove possible dirt.
- Insert new thermal separation between the combustion chamber and heat exchanger [3].

Note!

Airtronic L3 and XL3: The thermal separation between the combustion chamber and heat exchanger is installed together with the combustion chamber.

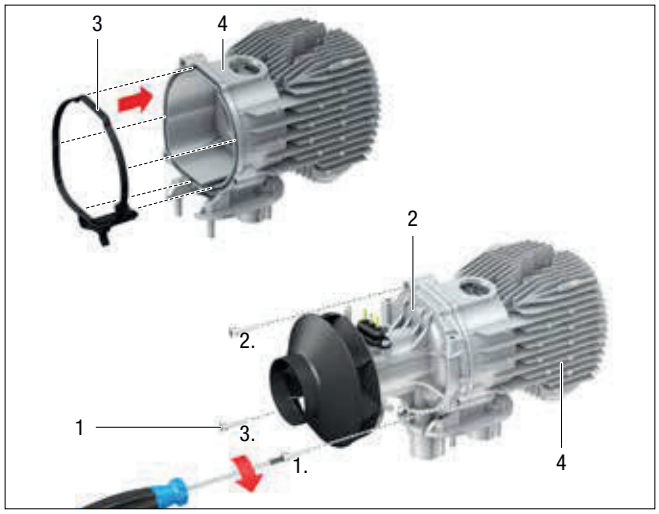
- 1. Position the baseplate of the heater from below.
- 2. Guide the fuel line through the baseplate. To do so, turn the baseplate slightly to the left to thread in the fuel grommet.
- 3. Tighten the 4 fixing screws M5 × 12 “crosswise” (i.e. diagonally opposite screws, one after the other).
  Tightening torque $5^{\pm 0.5}$ Nm.

- Insert the combustion chamber [2] with fan seal, fuel connection and grommet into the heat exchanger.
- Screw in the 3 fixing screws [1] and tighten in the described order, tightening torque $5^{\pm 0.5}$ Nm.

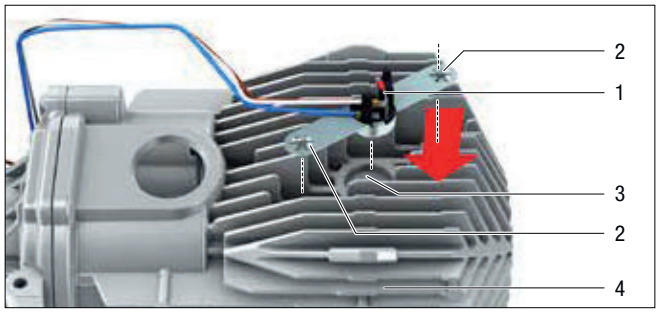
Note!

Airtronic M3, L3 and XL3: The combustion chamber is fixed with 4 screws. Tighten these “cross-wise” (diagonally opposite screws).

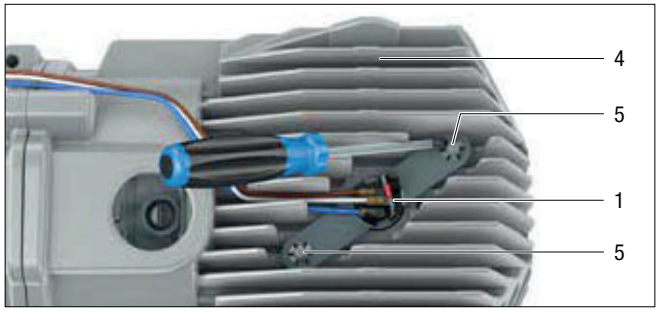
Next possible repair step:
Install fan, see step 5.5.3



1 Fixing screws M5 × 20 (Torx)
AL3 / AXL3: M5 × 25 (Torx)
2 Fan
3 Seal
4 Heat exchanger



1 Combination sensor
2 Claws
3 Retaining recess
4 Heat exchanger



1 Combination sensor
2 Claws
3 Retaining recess
5 Fixing bolt

5.5.3 Installing the fan

- If applicable, carry out step 5.5.2 first
- Insert the seal [3] into the existing groove in the heat exchanger [4] so that it exactly fits.

Note!
The seal is installed together with the fan. Before positioning the fan, ensure that it sits correctly in the groove provided for it in the heat exchanger housing.

- Fix the fan [2] using the fixing screws [1] and tighten in the given order. Tightening torque 4 $^{\pm 0.5}$ Nm.

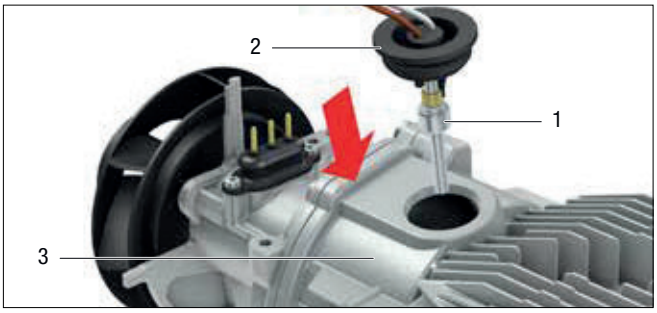
Note!
The combustion air impeller is a sensitive, high-precision moulded and balanced component. Therefore, when dismantling / installing the fan, never put it down on the combustion air impeller or expose the impeller to mechanical loads. Put the fan down to the side only.

Next possible repair steps:
– Install combination sensor, see step 5.5.4
– Install glow plug, see step 5.5.5

5.5.4 Installing the combination sensor

- Preassemble the combination sensor [1] manually on the two fixing bolts [5] on the heat exchanger [4].
- Use the auxiliary tool (included in the spare part kit) to press the fastening tabs of the combination sensor onto the fixing bolts [5] up to the limit stop.
- Check that the combination sensor sits correctly in the retainer recess [3].
- If necessary, use a cross-head screwdriver to push the claws [2] onto the fixing bolt [5] again.

Next possible repair step:
Install lower jacket shell, see step 5.5.9



1 Glow plug
2 Rubber grommet
3 Heat exchanger

5.5.5 Install glow plug

- Carry out step 5.5.2 to step 5.5.4.
- Insert the glow plug [1] into the connection sockets of the combustion chamber [on the inside]. Do not cant.
- Dry the rubber grommet [2] and insert it into the glow plug hole in the heat exchanger so that it fits exactly. Insert the grommet into the opening of the heat exchanger at an angle and carefully push in all round the perimeter until it latches into the groove. Press the grommet again along the complete perimeter to ensure that it is positioned correctly in the heat exchanger.

Note!

- If necessary, wet the rubber grommet with alcohol-water mixture. Do not use grease or oil, as otherwise the rubber grommet will become damaged.
- Cable layout as shown in the figure, 90° relative to the heater axis.
- Ensure that, on insertion, the groove of the rubber grommet tabs into the heat exchanger wall, noticeably and completely. Otherwise there is a risk of the grommet loosening and exhaust escaping.
- After installing, check the rubber grommet for tight fit and damage.

Warning!

Personal injuries and damage to the unit due to leaks

Incorrect installation of the rubber grommet leads to leaks and can result in personal injuries as well as malfunction or damage to the heater.

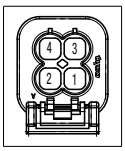
→ Insert the rubber grommet exactly into the glow plug hole in the heat exchanger and check for tight fit.

→ Do not reuse damaged rubber grommet.

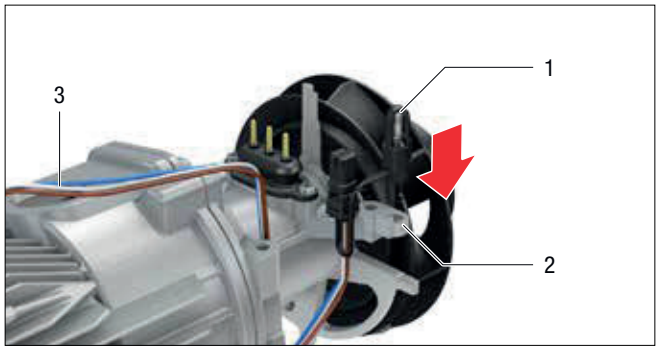
Next possible repair step:
Connect glow plug, see step 5.5.6

5.5.6 Connecting the glow plug

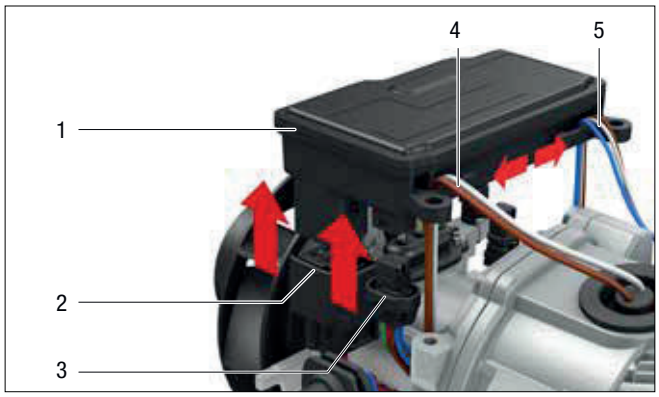
- Pin the connection cables of the glow plug in chamber 1 (WH) and chamber 3 (BN) of the connector for power supply and glow plug at the control box.



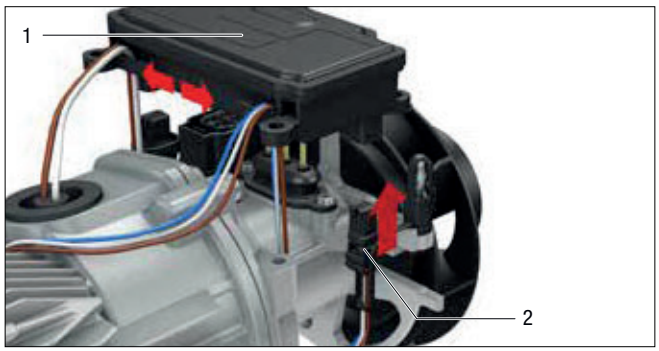
Connector shown from the cable inlet side.



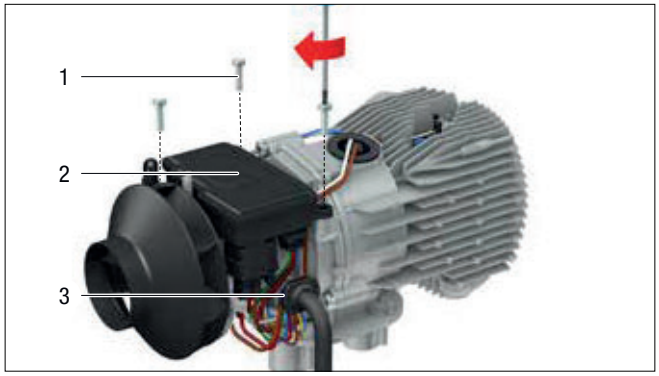
1 Temperature sensor
2 Temperature sensor retainer
3 Connecting leads



1 Control box
2 Power supply connector and glow plug
3 Connector, cable harness
4 Connection cable, glow plug
5 Connection cable, combination sensor



1 Control box
2 Connector, combination sensor and temperature sensor



1 Fixing screws M4 × 16 (Torx)
2 Control box
3 Grommet for cable harness

5.5.7 Install the temperature sensor

- Lay the connection cables of the temperature sensor and combination sensor [3] so that they do not become crushed.
- Insert the temperature sensor [1] into its retainer [2] in front of the impeller so that it latches into position.
- The connector of the temperature sensor and combination sensor is inserted in the control box later.

Next possible repair step:
Install control box, see step 5.5.8

5.5.8 Installing the control box

- Insert the connector for the power supply and the glow plug [2] cable harness connector [3] into the control box [1] from below.
- Insert the connection cables of the combination sensor [4] and glow plug [5] into the cable guides on both sides of the control box and pull downwards to prevent crushing of the cables.

- Insert the connector of the combination sensor and the temperature sensor [2] into the control box [1] from below.

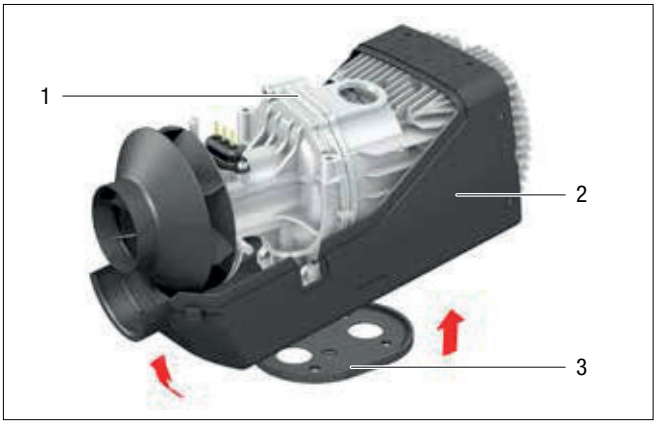
- Position the control box [2] on the 3 connection pins of the fan motor.

Note!

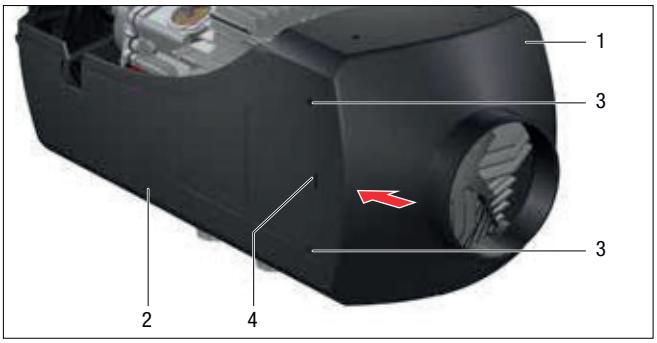
To ensure correct contact of the connection pins, the control box must be positioned horizontally and moved into the end position before screwing. This avoids damage to the connection pins.

- Fix the control box with 3 fixing screws [1].
  Tightening torque: 1.9 Nm ±10%

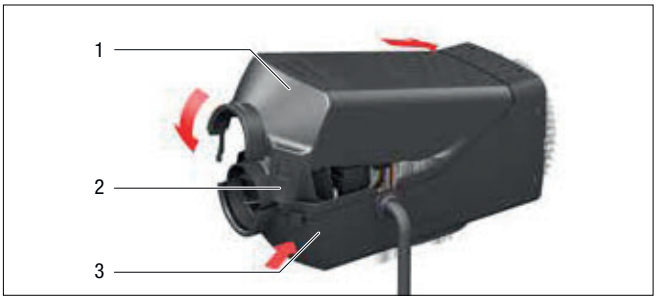
Next possible repair step:
Install lower jacket shell, see step 5.5.9



1 Heater
2 Jacket shell, bottom
3 Flange seal



1 Outlet hood
2 Jacket shell, bottom
3 Snap connector
4 Recess



1 Jacket shell, top
2 Latch fastener
3 Jacket shell, bottom

5.5.9 Mounting the lower jacket shell

- Depending on the connection situation in the vehicle, insert the grommet with the cable harness into the right or left-hand recess of the lower jacket shell.
- Insert the heater [1] into the lower jacket shell [2].
- Swing up the lower jacket shell

Note!

Airtronic X3 and XL3: Insert the spacer tabs of the fan housing positioned on the side into the recesses of the bottom jacket shell [2].

- Prefix with the flange seal [3].

Next possible repair step:
Install the outlet hood, see step 5.5.110
Mount upper jacket shell, see step 5.5.11

5.5.10 Installing the outlet hood

- 1. Position the outlet hood [1], with or without hot air hose, on the heat exchanger side of the lower jacket shell [2]. The pins of the snap connector [3] must be positioned on the jacket side with the recess [4].
- 2. Press the outlet hood into the lower jacket shell until the snap connectors latch into position.

Next possible repair step:
Install upper jacket shell, see step 5.5.11

5.5.11 Install the upper jacket shell

- 1. Insert the jacket shell [1] and fold down with precise fit.
- 2. Press together the jacket shells until the two latch fasteners [2] snap into position.
- Check the hot air impeller for free running.
- The heater is ready for installation.

Next possible repair step:
Install the heater, see step 5.5.12

5.5.12 Installing the heater

- Use the fixing screws to screw the heater onto the vehicle.
- Make the fuel connection.
- Attach the combustion air hose.
- Attach the exhaust pipe.
- Connect the heater cable harness to the vehicle's cable harness.
- Perform functional test (see Page 6).

5.6 Checking the fuel supply

Before measuring the fuel quantity, check the following points in the fuel supply.

- If necessary, check the strainer in the metering pump.
- Check the laying of the fuel pipes.
- Check fuel pipes for leaks.
- Check the hose connections for leaks and repair if necessary.
- Is the fuel removal installed according to the details in the technical description?

5.6.1 Measuring the fuel quantity with EasyScan

Preparation

- Pull off the fuel pipe at the heater and discharge the fuel into a measuring cylinder (volume > 25 cm^3).
- Make the connection between the heater and EasyScan diagnostic interface VCI. To do this, connect the EasyScan to the diagnostics connector of the cable harness.
- Start the EasyScan diagnostic software
- In the “Diagnosis” men u, open the [Components] tab.
- Call up the [Select function] submenu.
- Enter this test parameter in the [Parameter] menu:
  - Frequency: 7 Hz
  - Duration. 60 seconds
- Press the [Start] button to start the measurement.
- Wait until the measurement process has ended, then read off the pumped quantity of fuel in the measuring centre.
  If the measured quantity of fuel lies outside the values listed in the table, the metering pump must be replaced.

Table of values – fuel quantity

Heater type	**Airtronic 3**				
Heater version	S3 (B2L)	S3 (D 2 L) M3 (D 4 L)	M3 (B 4 L)	X3 (D 6 L)	XL3 (D 8 L)
Delivery period in sec.	**60**				
Fuel quantity, nominal [ml]	7.6	8.7	8.1	12.4	25.0
Fuel quantity - max. [ml]	8.5	9.5	8.9	13.6	27.5
Fuel quantity - min [ml]	6.8	7.9	7.3	11.2	22.5

Note

- The purely manual measurement of the fuel delivery rate has too many uncertainty factors to supply reliable results. Ambient factors influence the manually determined delivery rates significantly: battery voltage, reference altitude above seal level, room temperature, etc.

→ Eberspächer recommends use of EasyScan to achieve the most deviation-free measurement possible.

6 Electrics

6.1 Heater wiring

The electronic control box is integrated in the heater, which makes wiring during installation much easier.

Caution

Safety instructions

The heater is to be connected up electrically according to the EMC directives.

EMC can be affected if the heater is not connected up correctly. For this reason, comply with the following instructions:

- Ensure that the insulation of electrical cables is not damaged.
  Avoid: Chafing, kinking, jamming or exposure to heat.
- In waterproof connectors, seal any connector chambers not in use with filler plugs to ensure they are dirt-proof and water-proof.
- Electrical connections and ground connections must be free of corrosion and firmly connected.

Note

- Comply with the following when wiring the heater and the control unit:
- Electrical leads, switch and control boxes must be positioned in the vehicle so that they can function perfectly under normal operating conditions without impairment (e.g. due to heat exposure, moisture, etc.).
- The following cable cross-sections are to be used between the battery and heater. This ensures that the max. permissible voltage drop in the cables does not exceed 0.5 V for 12 V or 1 V for 24 V rated voltage.
  Cable cross-sections for a cable length (plus cable + minus cable) of:
  - up to 5 m = cable cross-section 4 mm^2
  - from 5 m to 8 m = cable cross-section 6 mm^2
- If the positive cable is to be connected to the fuse box (e.g. terminal 30), the vehicle's cable from the battery to the fuse box must also be included in the calculation for the total cable length and re-dimensioned if necessary.
- Insulate unused cable ends.

6.2 Parts lists for the circuit diagrams, Airtronic 3

-A1	Airtronic Ax3 control box
-A30	Fuse holder, 3 pin
-B1	Air inlet sensor, internal (LEF1)
-B6	Flame and air outlet sensor
-R2	Terminating resistor II
-R3	Terminating resistor, stub line
-F1	Heater fuse: 12 V = 20 A / 24 V = 10 A
-HG	Heater
-R1	Glow plug
-Y1	Fuel metering pump
-p	Switch output

-XB6/1 Bush housing, tester
-XS6/1 Mating connector with terminating resistor

Optional
b Activation of vehicle blower and / or separate fresh air fan

Note

- The plus signal is applied in “Low” control stage only (PIN 16, plus signal for relay, Imax = 200 mA).

d to the ADR acknowledgement button*
n Generator input D+
o Secondary drive input NA+
*) Not applicable for North America

Note

- It must be ensured that if the battery isolating switch is pressed due to EMERGENCY STOP, all the heater's electric circuits are disconnected from the battery immediately (without any consideration of the heater's status).
- If the battery isolating switch is pressed to disconnect the battery from all electric circuits, the heater must be switched off first and if applicable you must wait until the heater's afterrun has finished.

a to the heater
c1 to the CAN control unit
c2 to the LIN control unit / S+
g to the external temperature sensor / mini controller
x insulate and tie back any cables that are not needed

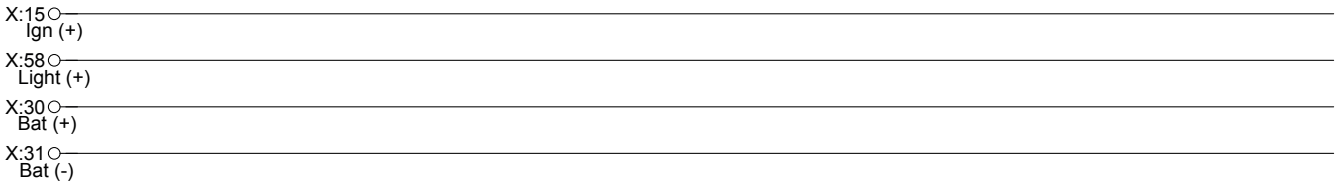
Note

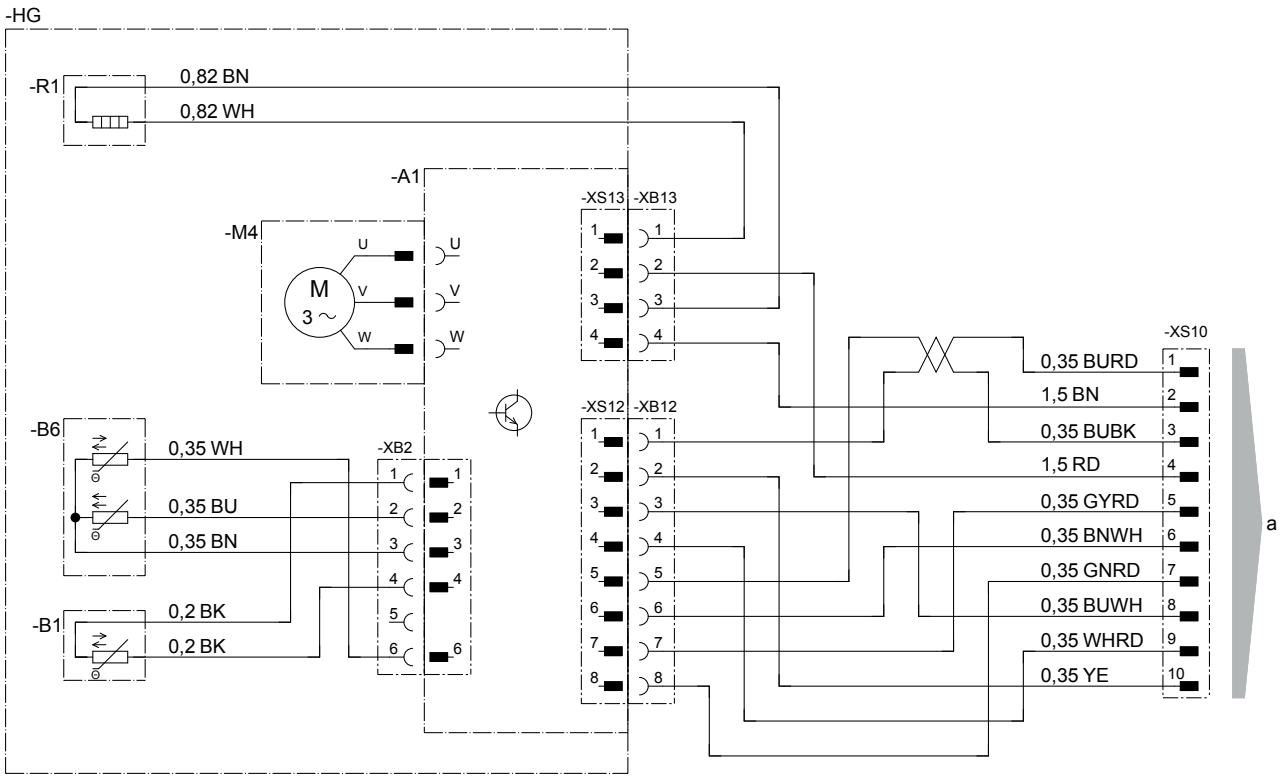
Circuit diagram for Airtronic S3 / Airtronic M3 from page 44.
Circuit diagrams for control units, e.g. EasyStart Remote+ etc. see from page 48.

Cable colours					
bk	=	black	og	=	orange
bn	=	brown	rd	=	red
bu	=	blue	vt	=	violet
gn	=	green	wh	=	white
gy	=	grey	ye	=	yellow

6.3 Circuit diagrams, Airtronic 3

6.3.1 Heater

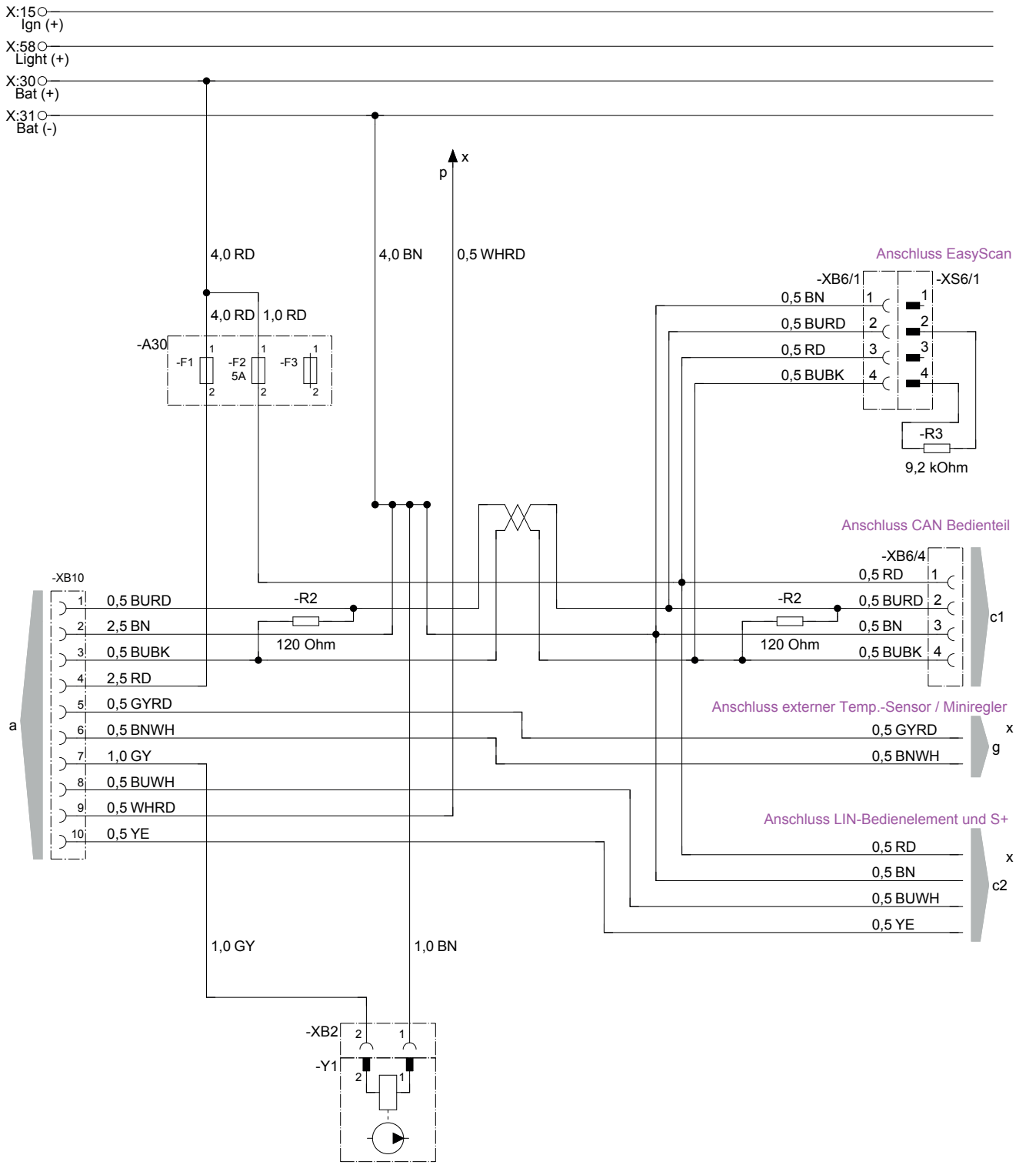




Parts list on page 42

25.2953.00.9601.0A

6.3.2 Cable harness 12 V* / 24 V*

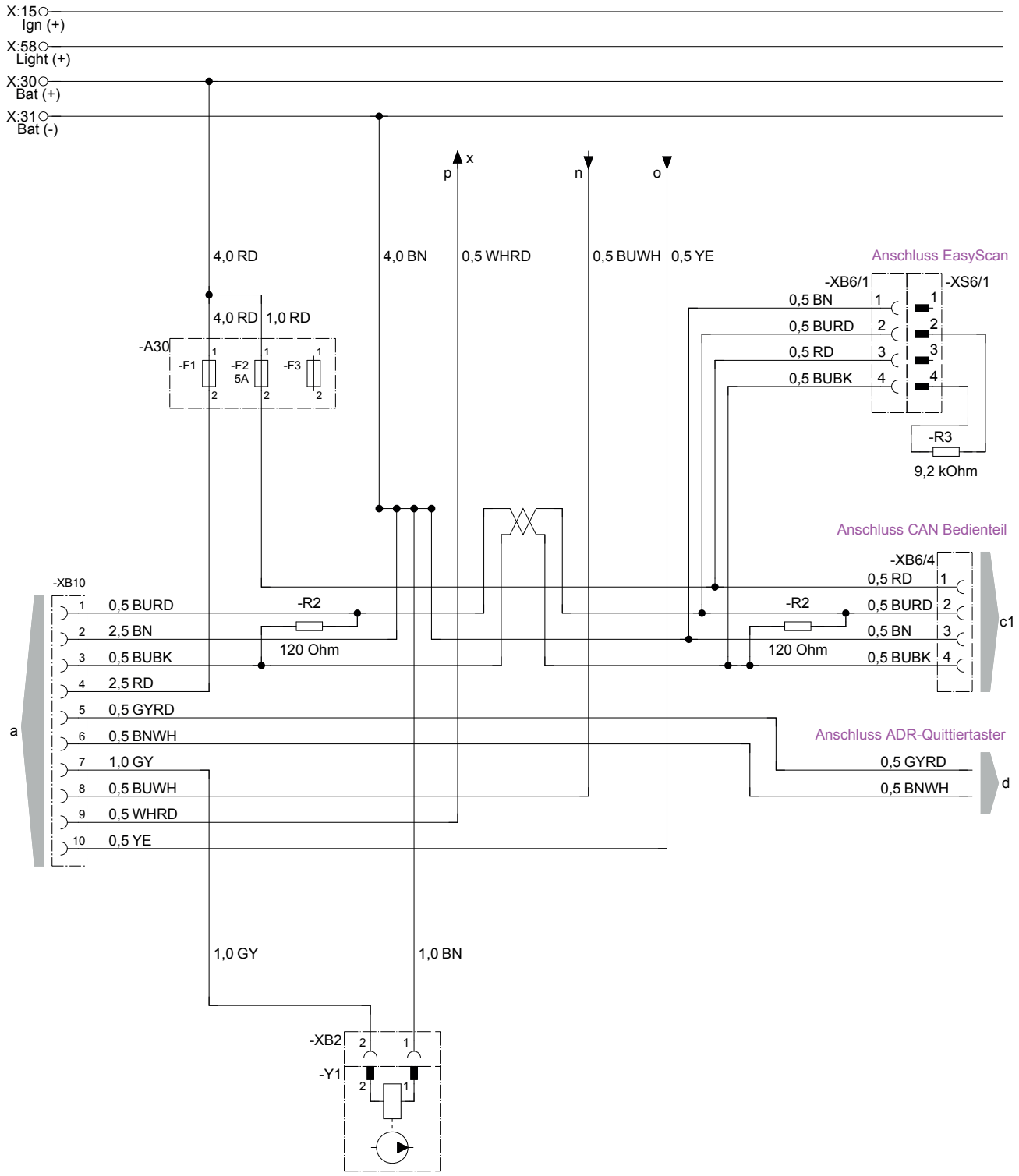


Parts list on page 42

25.2953.00.9602.0A

*) Not applicable for North America, refer to the AX3 Addendum (N-A) for the specific diagram.

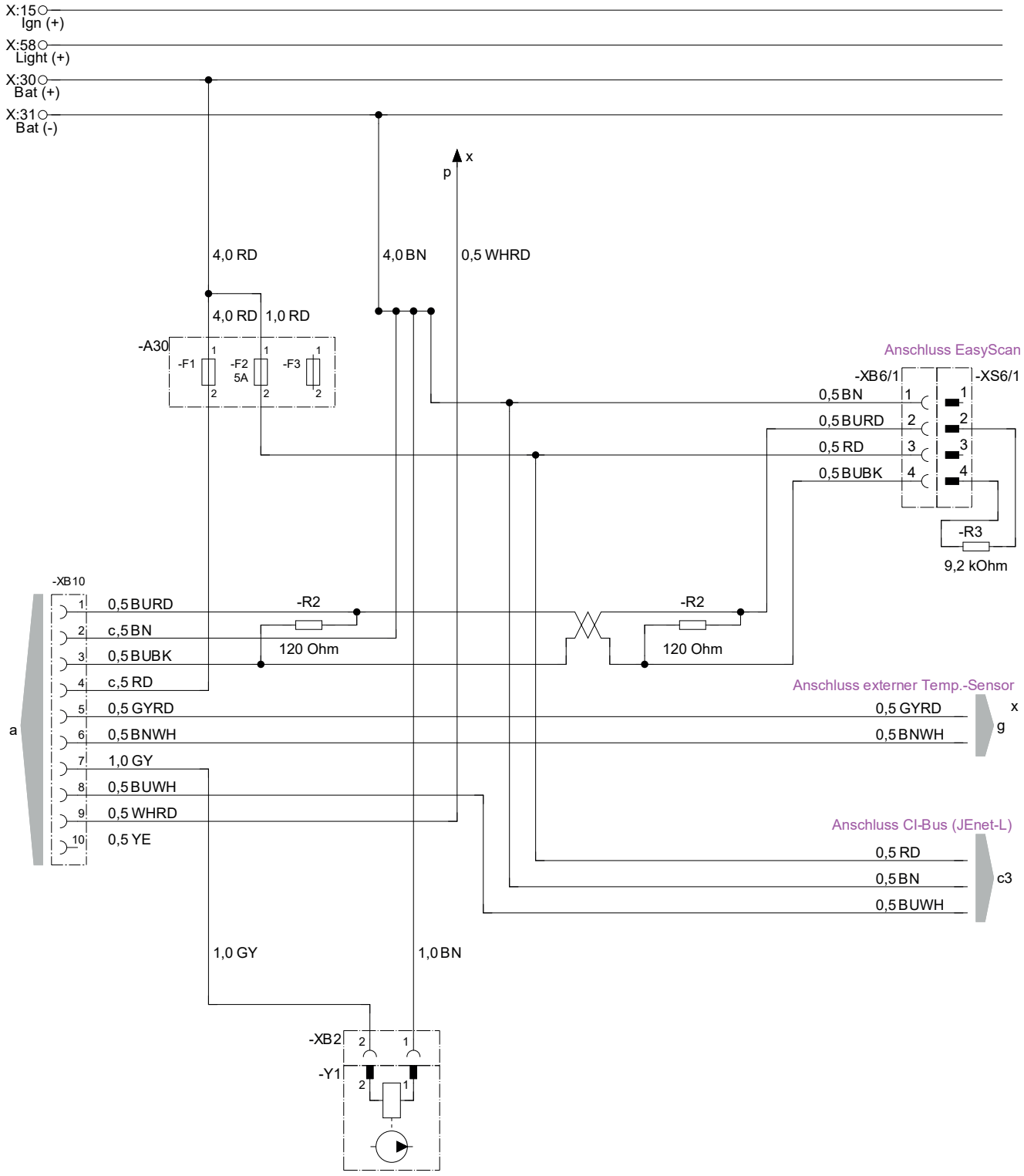
6.3.3 Cable harness, 24 V with ADR*



Parts list on page 42
*) Not applicable for North America.

25.2953.00.9603.0A

6.3.4 Cable harness, 12 V with CI-Bus*



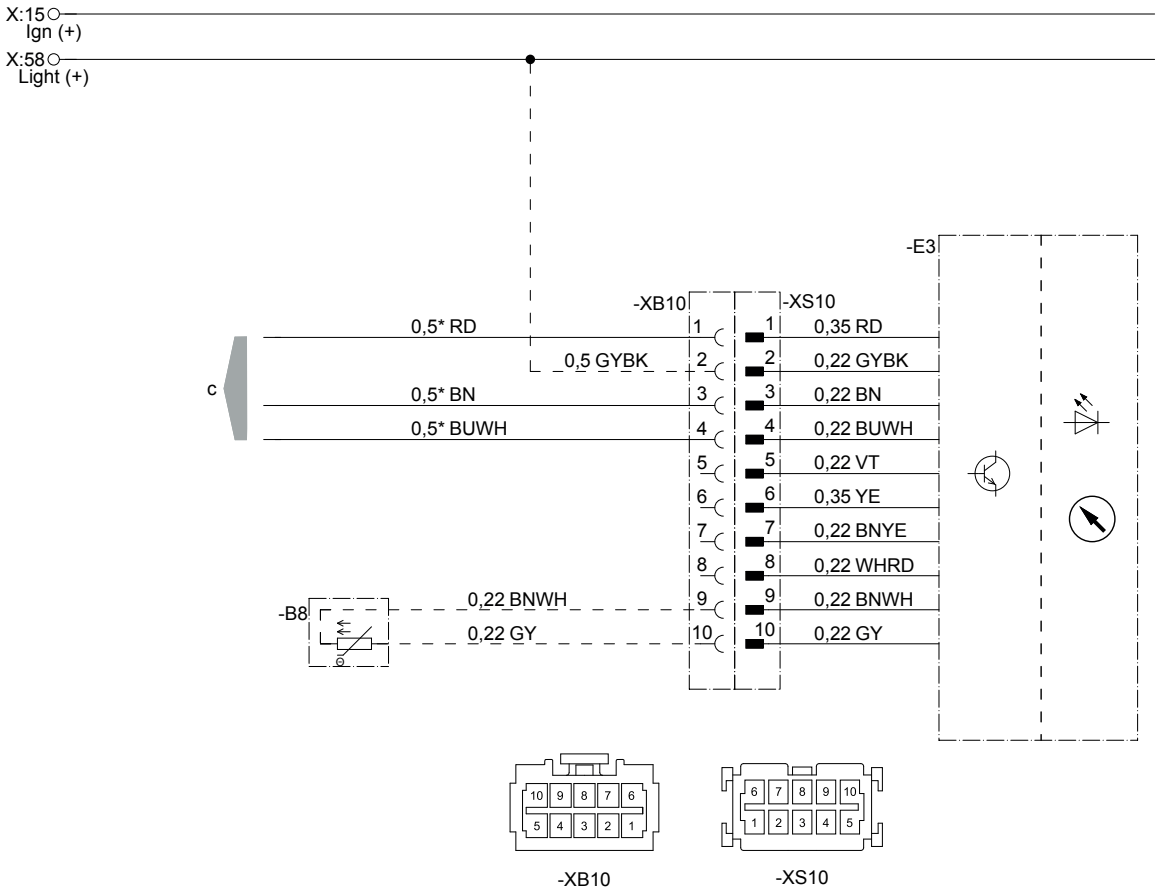
Parts list on page 42

*) Not applicable for North America.

25.3051.00.9602.0A

6.4 Circuit diagrams, control units TP 7.0 (for 12 V only)

6.4.1 EasyStart Timer



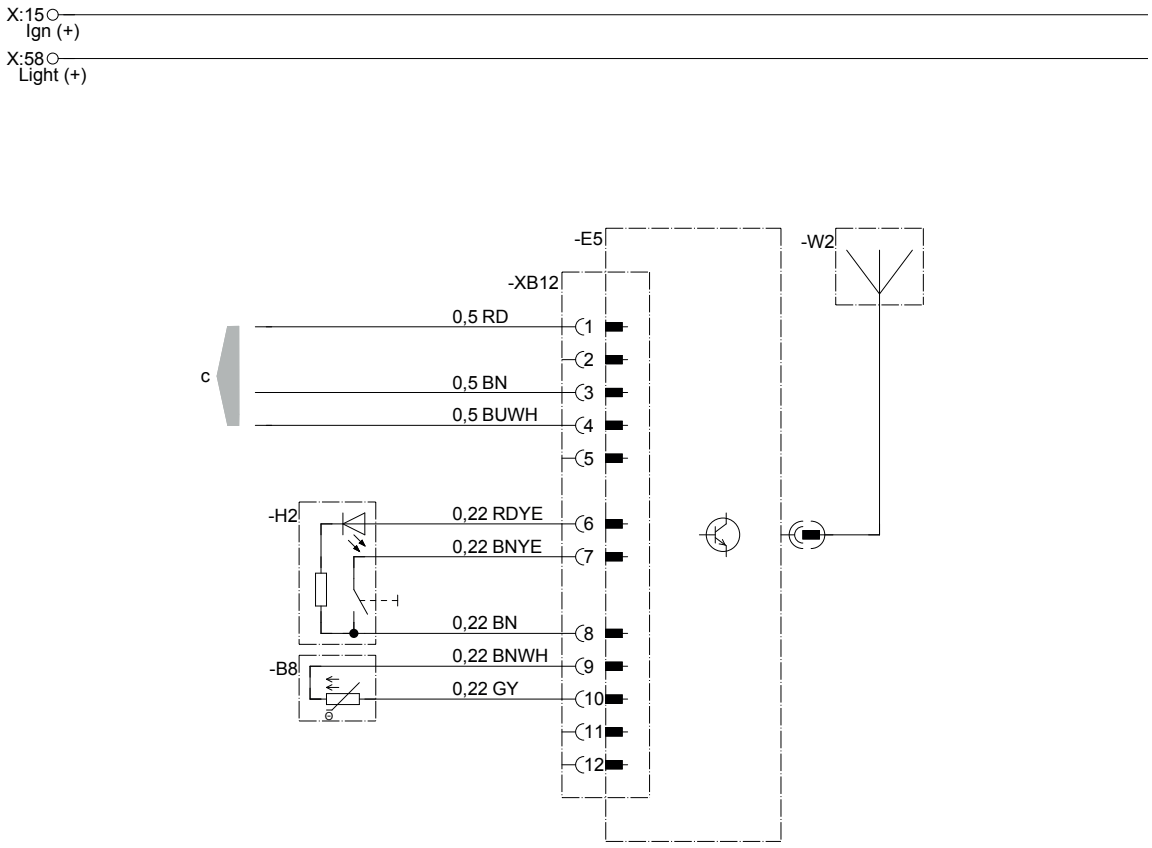
22.1000.34.9701

-B8 Room temperature sensor (optional)
-E3 EasyStart Timer
c to the heater

Note

- EasyStart timer only for Airtronic 2 12 V, Airtronic 3 12 V
- Heater circuit diagrams, from page 44.
- Further circuit diagrams for the EasyStart timer are printed in the Installation Instructions Plus, these are available to view and download from the Service Portal.

6.4.2 EasyStart Remote+ *



22.1000.34.9729

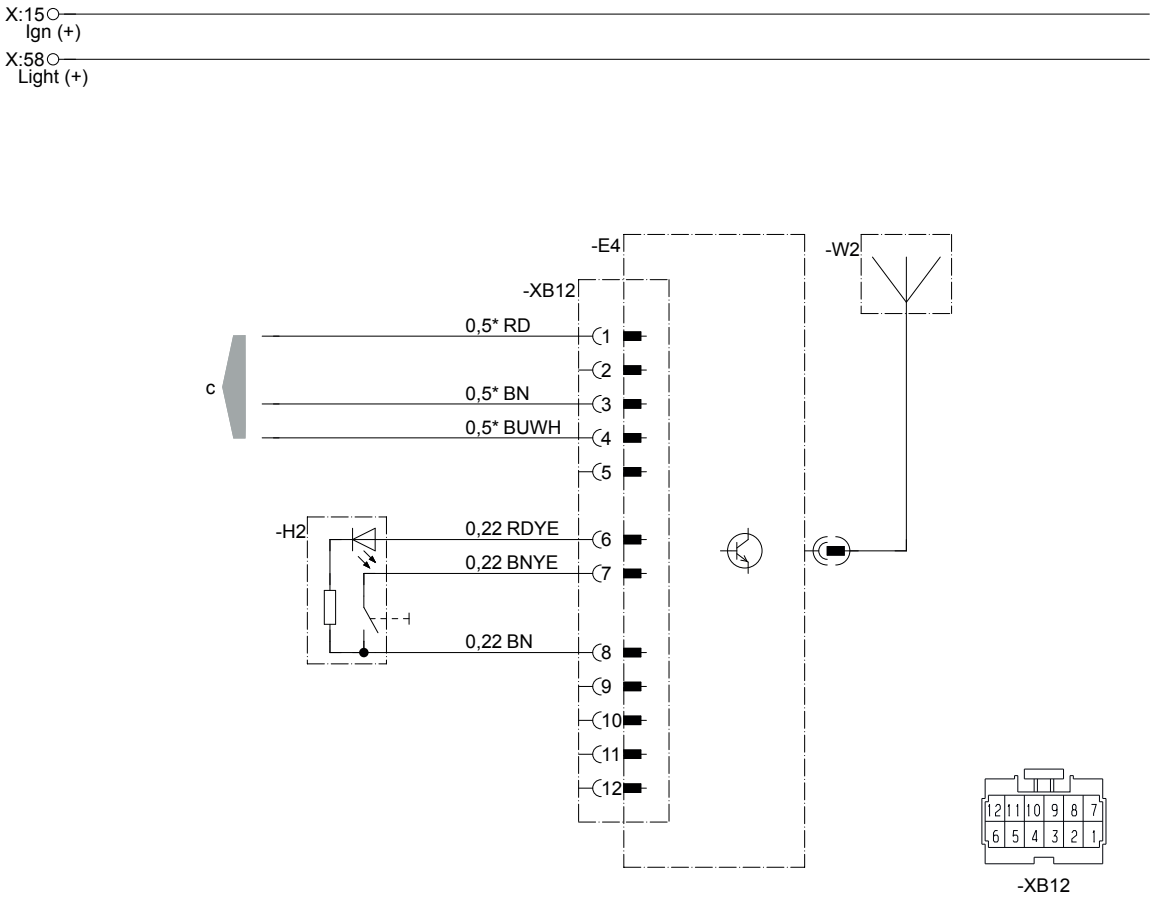
-B8 Room temperature sensor
-E5 Stationary unit, EasyStart Remote+
-H2 Button
-W2 Antenna
c to the heater

*) Not applicable for North America.

Note

- EasyStart Remote+ only for Airtronic 2 12 V, Airtronic 3 12 V
- Heater circuit diagrams, from page 44.
- Further circuit diagrams for the EasyStart Remote+ are printed in the Installation Instructions Plus, these are available to view and download from the Service Portal.

6.4.3 Easy Start Remote*



22.1000.34.9733

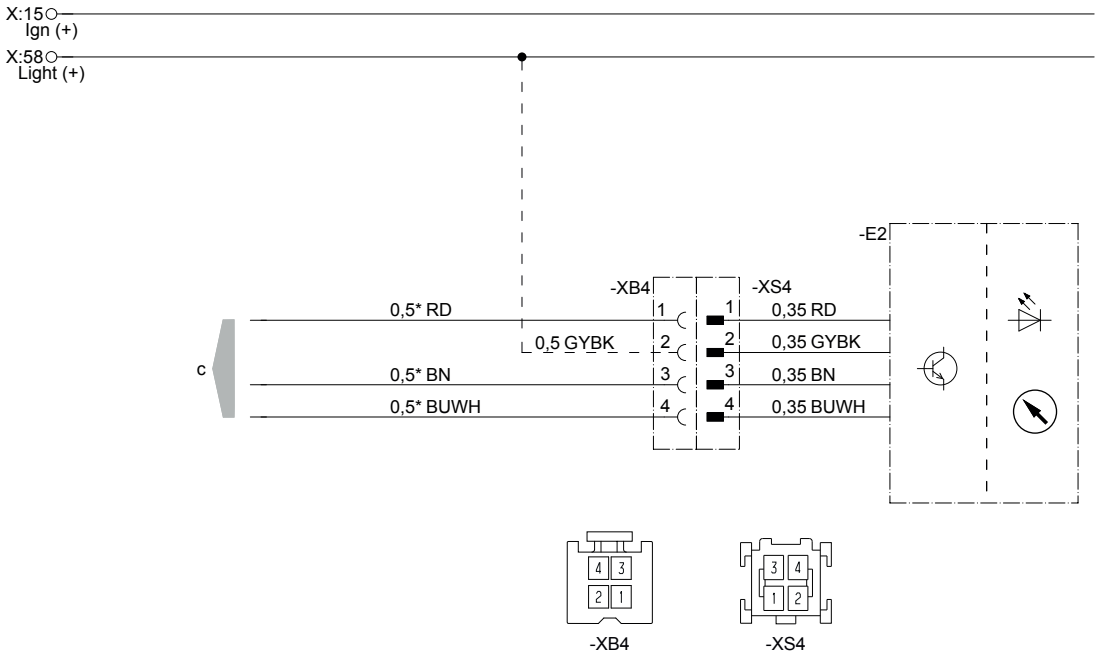
-E4 Stationary unit EasyStart Remote
-H2 Button
-W2 Antenna
c to the heater

*) Not applicable for North America.

Note

- EasyStart Remote only for Airtronic 2 12 V, Airtronic 3 12 V
- Heater circuit diagrams, from page 44.
- Further circuit diagrams for the EasyStart Remote are printed in the Installation Instructions Plus, these are available to view and download from the Service Portal.

6.4.4 EasyStart Select



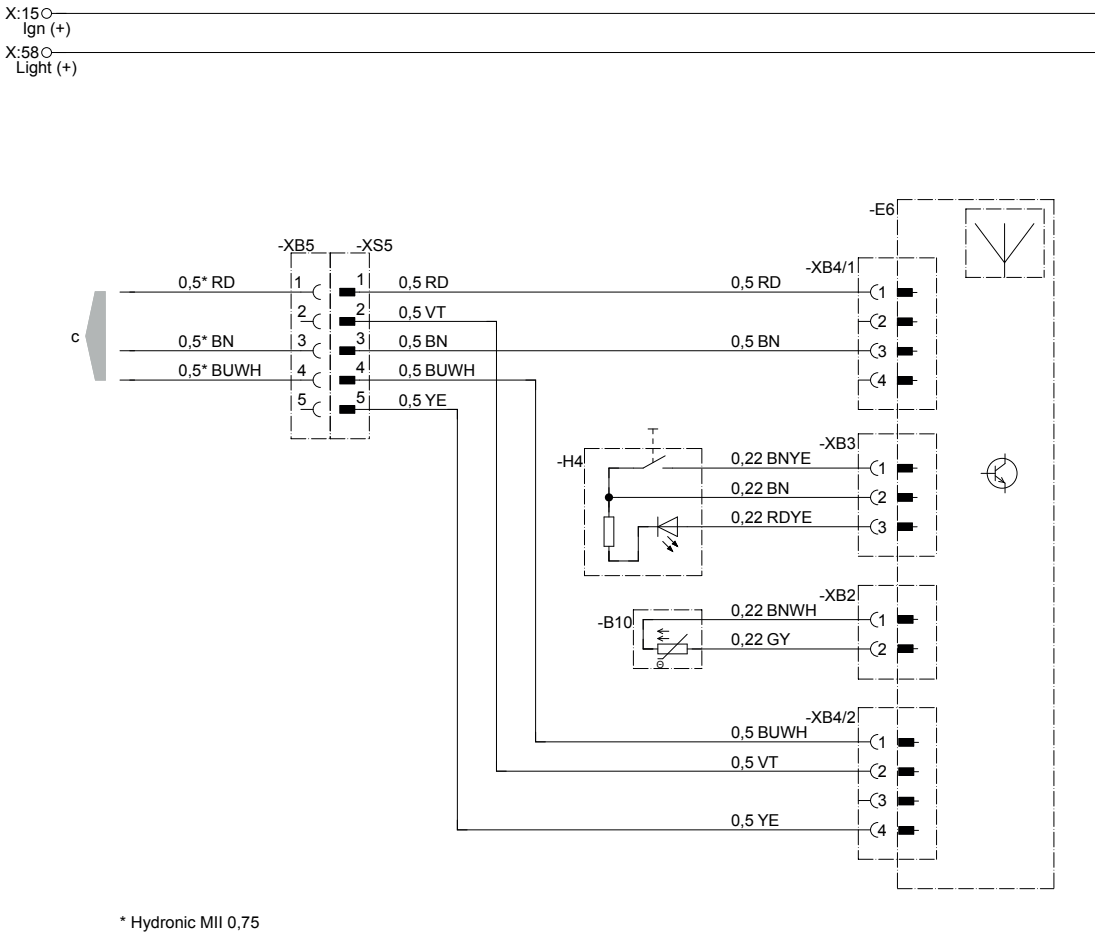
22.1000.34.9734

-E2 EasyStart Select
c to the heater

Note

- EasyStart Select only for Airtronic 2 12 V, Airtronic 3 12 V
- Heater circuit diagrams, from page 44
- Further circuit diagrams for the EasyStart Select are printed in the Installation Instructions Plus, these are available to view and download from the Service Portal.

6.4.5 EasyStart Web



* Hydronic MII 0,75

22.1000.34.9719

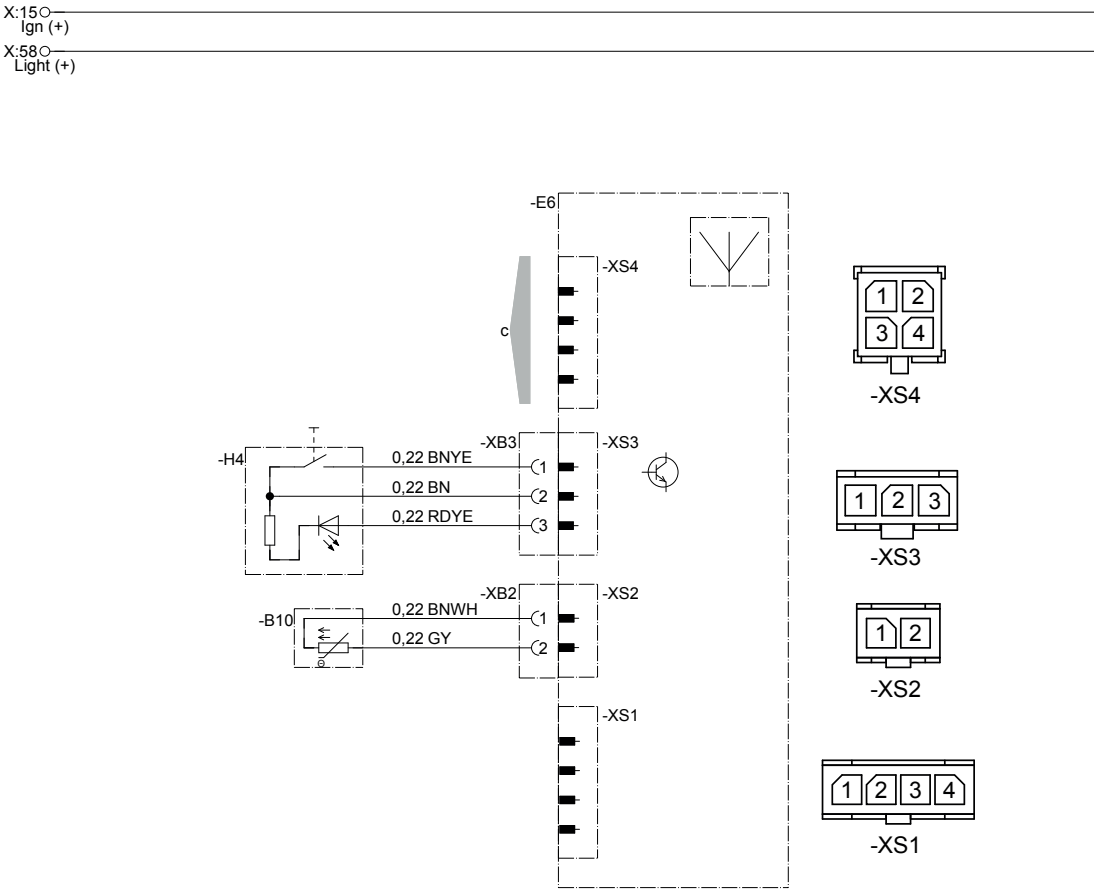
c to the heater
-H4 Easy Start Web button
-B10 Sensor, interior temperature
-E6 EasyStart Web

Note

- EasyStart Web only for Airtronic 2 12 V, Airtronic 3 12 V
- Heater circuit diagrams, from page 44.
- Further circuit diagrams for the Easy Start Web are printed in the Installation Instructions Plus; these are available to view and download from the Service Portal.

6.5 Circuit diagrams, control units TP 7.1, TP 7.2

6.5.1 EasyStart Web



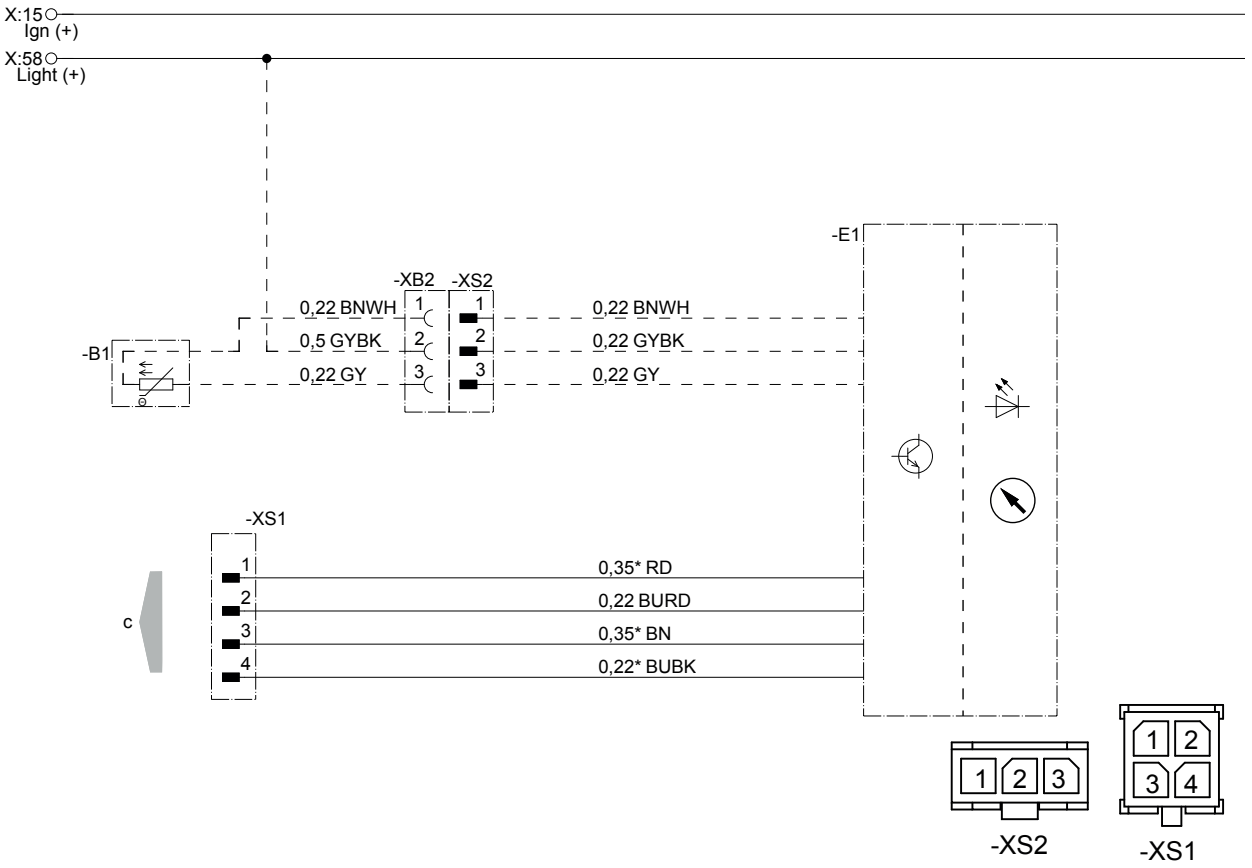
22.1000.34.97x1.0x

c to the heater
-H4 Easy Start Web button
-B10 Sensor, interior temperature
-E6 EasyStart Web

Note

- Heater circuit diagrams, from page 44.
- Further circuit diagrams for the Easy Start Web are printed in the Installation Instructions Plus; these are available to view and download from the Service Portal.

6.5.2 Easy Start Pro



22.1000.35.2210

-B1 Room temperature sensor (optional)
-E1 Easy Start Pro
c to the heater

Note

- Heater circuit diagrams,from page 44.
- Further circuit diagrams for the Easy Start Pro are printed in the Installation Instructions Plus*; these are available to view and download from the Service Portal.

*) For North America, refer to the NA versions of the EasyStart Pro Installation Instructions and Addendum

7 Service

7.1 Technical Support

If you have any technical questions or problems with the heater, the control unit or the operating software, please contact the following service address:
support-UK@eberspaecher.com

In North America please turn to:
support-US@eberspaecher.com

8 Environment

8.1 Certification

The high quality of the Eberspächer products is the key to our success.
To guarantee this quality, we have organised all work processes in the company along the lines of quality management (QM).
Even so, we still pursue a large number of activities for continuous improvement of product quality in order to keep pace with the similarly constantly growing requirements made by our customers.
All the steps necessary for quality assurance are stipulated in international standards.
This quality is to be considered in a total sense.
It concerns products, processes and customer - supplier relationships.
Officially approved public experts assess the system and the corresponding certification company awards a certificate.
Eberspächer Climate Control Systems International GmbH has qualified for the following standards:
Quality management in accordance with
ISO TS 9001:2015 and IATF 16949:2016
Environmental management system in accordance with
ISO 14001:2015

8.2 Disposal

Disposal of materials and reuse of recoverable materials
End-of-life devices and their components, defective components and packaging material can all be separated into their constituent materials so that all parts can be disposed of as in an environment-friendly manner or recycled where applicable.

Environmentally-friendly disposal includes the possible separation of materials so that recoverable materials can be reused. Ensure that end-of-life devices and their components are disposed of properly and are recycled.

Note
Waste products such as used fuel-carrying components and similar wearing parts can harm the environment as well as people and animals and should therefore be disposed of properly. Contact your local recycling company or your specialist dealer to find out how waste products are to be disposed of properly.

The packaging of the heater can be kept in case the heater has to be sent back.

8.3 Note on environmental protection

WEEE Directive 2012/19/EU
Electrical and electronic equipment and batteries may not be disposed of with household waste.

Note
The consumer is legally required to return electrical and electronic equipment, as well as batteries, to public collection points set up for this purpose, or to return them to the sales outlet. Details are specified by the respective national law. The symbol on the product, instructions for use or packaging refers to these provisions.

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Eberspächer

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