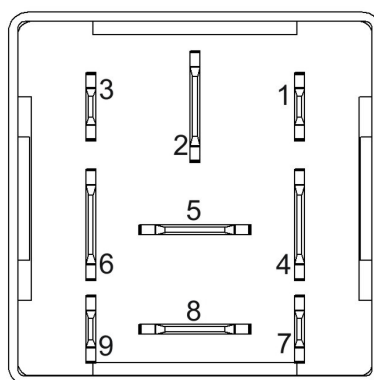


Mounting direction



View of plug

DESCRIPTION

The Motor Controller 10 A CAN is a microcontroller-based module for controlling direct current (DC) motors and is suitable for automotive applications, among others. Thanks to its compact design, it saves valuable space and can be used in a variety of ways in your application. The motor controller has 3 analogue inputs and a full bridge with motor output for up to 10 A power.

TECHNICAL DATA

| | |
|---|--|
| Housing | Waterproof potted plastic housing; Plastic PA66 GF30 |
| Connector | FASTON terminal 6.3 mm FASTON terminal 2.8 mm |
| Weight | 61 g |
| Temperature range acc. to ISO 16750-4 | -40 °C...+85 °C |
| Environmental protection acc. to ISO 20653 | IP6K8 without potentiometer with correct mounting position (connection pins vertically downwards) and use of the waterproof socket otherwise IP40/IP20 (without/ with potentiometer) |
| Fuse protection | 1 A + load |
| Total inputs and outputs | 3 (2 inputs, 1 motor output) |
| Inputs | Analog inputs 0...11.4 V |
| Outputs | 1 motor fullbridge |
| Supply voltage | 9...32 V (Code C for 12V, Code E for 24 V, acc. to ISO 16750-2) |
| Overvoltage protection | ≥ 33 V |
| Current consumption | 25 mA at 12 V and 24 V |
| Quiescent current | 700 µA at 12 V 1280 µA at 24 V |
| Reverse polarity protection | integrated |
| CAN interfaces | CAN Interface 2.0 A/B, ISO 11898-2 |

REGULATORY APPROVALS AND TESTING

E1 approval 10 R - 05 7515

Electrical tests

Acc. to ISO 16750-2 or -4:

Supply voltage
Long term overvoltage at T_{max} -20 °C
Superimposed alternating voltage
Slow decrease and increase of supply
voltage
Momentary drop in supply voltage
Reset behaviour at voltage drop
Starting profile
Reversed voltage
Pin disconnection
Connector disconnection
Short circuit
Storage test at T_{min} and T_{max}
Operation test at T_{min} and T_{max}
Temperature step test
Damp heat, steady state test

Acc. to ISO 7637-2:

Pulse 1, 2a, 2b, 3a, 3b, severity level III

Acc. to ISO 10605:

ESD up to ± 6 kV contact discharge
ESD up to ± 8 kV air discharge

Chemical tests

Acc. to ISO 16750-5:

AA, AB, AC, BA, BB, BC, BD, CA, CB,
CC, CD, DB, DF, DG, EA

SOFTWARE/PROGRAMMING

Programming System

MRS APPLICS STUDIO

The Applica Studio is the new development and tool platform for our assemblies. Program your MRS controls quickly and easily with our stand-alone software. The focus is on your application.

INPUT FEATURES - SUMMARY

| | | |
|---|---|-------------------------|
| Pin 1, 3 | Programmable as analog or digital input | |
| | Resolution | 12 Bit |
| Voltage input standard variant 0...11.4 V (see A) | Input resistance | 22.6 k Ω |
| | Input frequency | $f_g^1 = 76 \text{ Hz}$ |
| | Accuracy | $\leq 3 \%$ |
| Digital input (see B) | Input resistance | 22.6 k Ω |
| | Turn-on threshold | $6.6 \pm 0.3 \text{ V}$ |
| | Turn-off threshold | $4.9 \pm 0.3 \text{ V}$ |
| | Accuracy | $\leq 3 \%$ |

¹ Cutoff frequency (-3 dB)

OUTPUT FEATURES - SUMMARY

| | | |
|--|---|---------------|
| Pin 5, 8 (M1, M2) | Protective circuit for inductive loads | integrated |
| | Wire fault diagnostics | integrated |
| | Short circuit diagnostics | integrated |
| Motor-output (Full-bridge; see C) | Switching voltage | 6...32 V |
| | max. switching current (permanent, $T = +85 \text{ }^\circ\text{C}$) | see load test |
| | PWM frequency | max. 25.5 kHz |
| Short circuit resistance against GND and U_s | Shutdown of the outputs controlled by output driver | |

LOAD TEST AT $T_{+85 \text{ }^\circ\text{C}}$ MOTOR-OUTPUT (FULLBRIDGE)

| Test without PWM | Test no. | Load | Duration |
|------------------|----------|--------|-----------|
| | 1 | 12.5 A | Permanent |

| Test with PWM | Test no. | Freq. / duty cycle | Load | Duration |
|---------------|----------|--------------------|-----------------------------------|-----------|
| Diagram 1 | 1 | 20 kHz 89 % | 7.4 A, resistive load | Permanent |
| Diagram 2 | 2 | 20 kHz 89 % | 5.9 A, resistive / inductive load | Permanent |

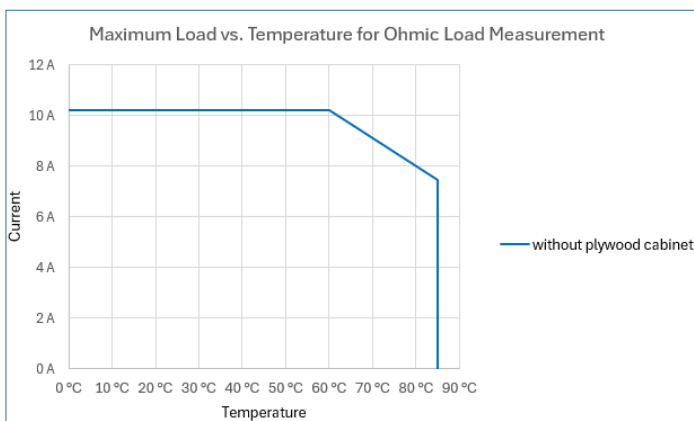


Diagram 1

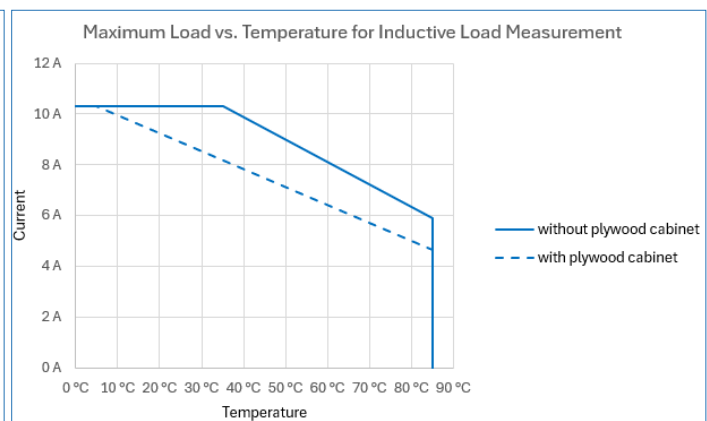


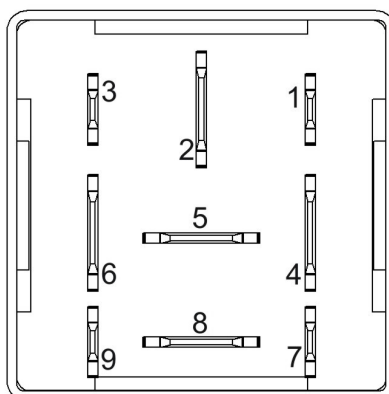
Diagram 2

PIN ASSIGNMENT POWER SUPPLY AND INTERFACES

| Pin | Description | Pin | Description |
|-----|-----------------------|-----|-------------|
| 2 | KL30 / Supply voltage | 7 | CAN-H |
| 4 | KL15 / Ignition | 9 | CAN-L |
| 6 | KL31 / GND | | |

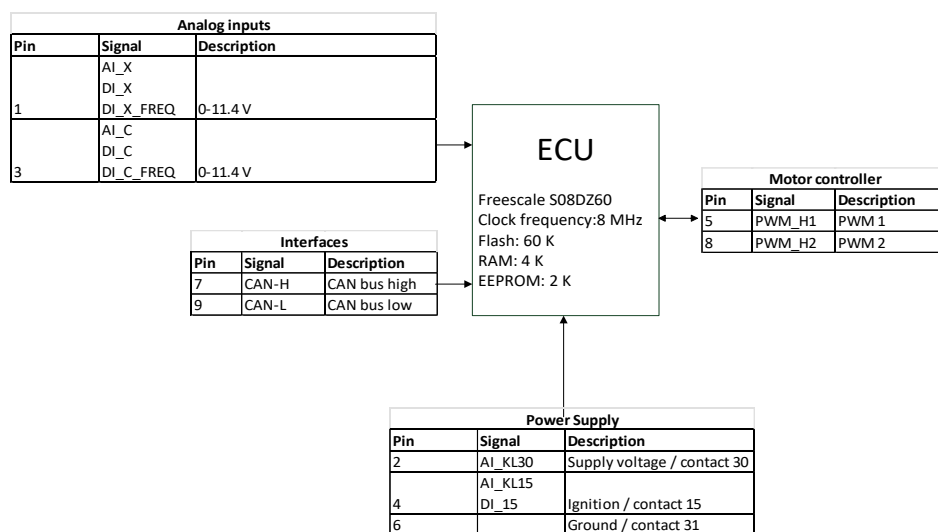
PIN ASSIGNMENT INPUTS AND OUTPUTS

| Pin | Signal | Description | Pin | Signal | Description |
|-----|--------|-------------|-----|---------------------------|--|
| 5 | PWM_H1 | PWM 1 (M1) | 1 | AI_X DI_X DI_X_FREQ | Analog input X or Digital input X or Frequency input X |
| 8 | PWM_H2 | PWM 2 (M2) | 3 | AI_C DI_C DI_C_FREQ | Analog input C or Digital input C or Frequency input C |

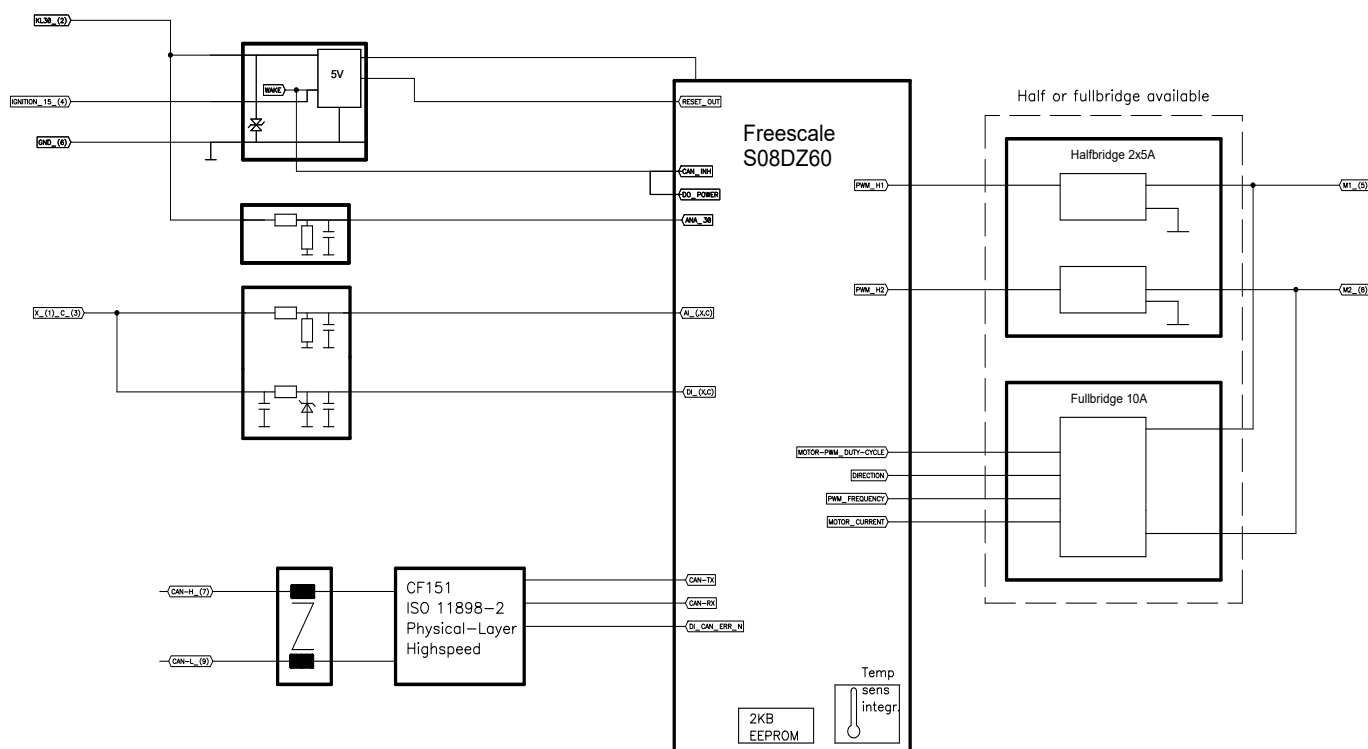


Pin assignment - bottom view

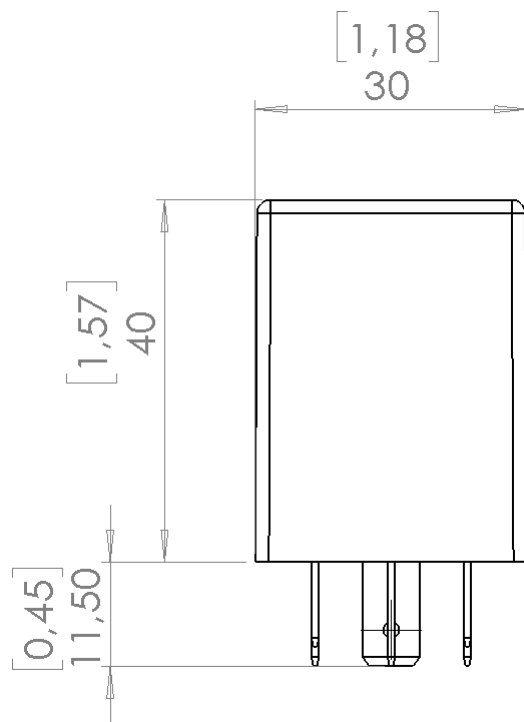
PIN - OVERVIEW



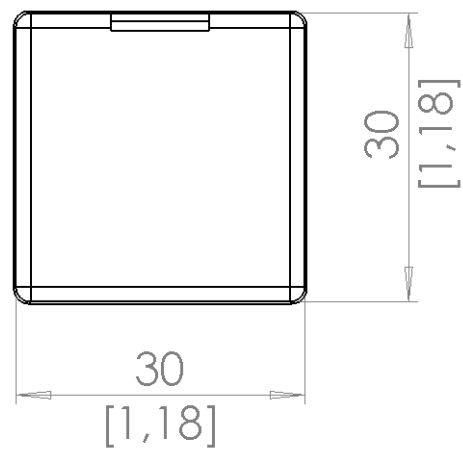
BLOCK FUNCTION DIAGRAM



TECHNICAL DRAWING IN MM [INCH], TOLERANCES ACCORDING TO ISO 2768-1 V



Side view



Top-down view

ASSEMBLY VARIANTS AND ORDERING INFORMATION

| | Inputs numbering | | Outputs numbering | Wake up sources | Remarks |
|----------------------|----------------------------|--------------------|----------------------|---------------------|-----------------------------|
| | A Voltage 0...11.4 V | B Digital input | C Motor output | | |
| 1.117.300.00 | 1, 3, 4 | 1, 3, 4 | 5, 8 | CAN, KL15, DO_POWER | with Poti |
| 1.117P.300.00 | 1, 3, 4 | 1, 3, 4 | 5, 8 | CAN, KL15, DO_POWER | with Poti, CANopen (CiA401) |

SCIP number: 15fce980-1d07-4f16-9fc5-5bc3dd1a42c6

ACCESSORIES

| Description | Order number |
|---|--------------|
| MRS Applies Studio | 1.100.200.01 |
| Socket | 1.017.002.00 |
| Socket package watertight 40 mm | 1.017.010.40 |
| Cable set | 109446 |
| FASTON terminal for latching 6,3 mm 1,5-2,5 mm ² | 103064 |
| FASTON terminal for latching 2,8 mm 0,5-1,0 mm ² | 105292 |
| PCAN-USB Interface | 105358 |

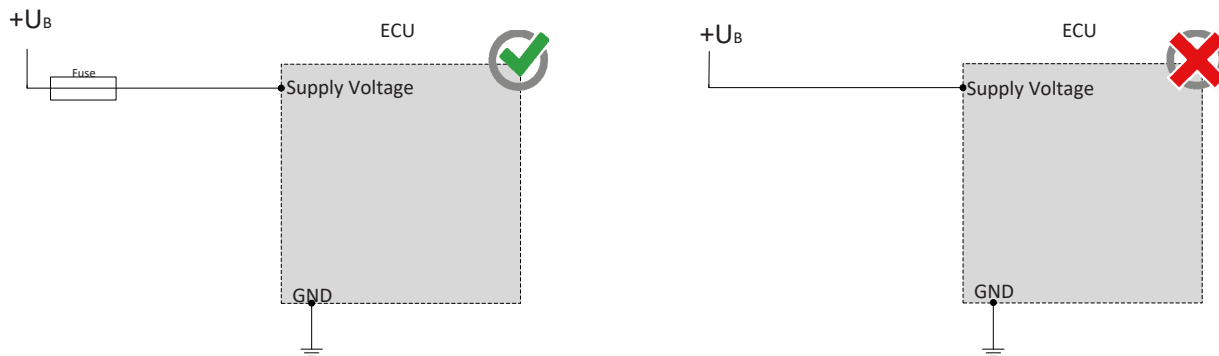


MANUFACTURER

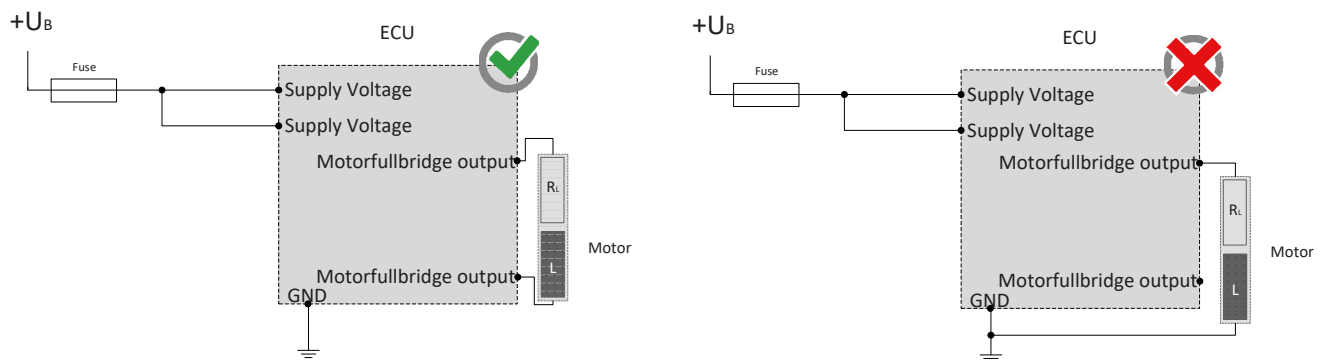
MRS Electronic GmbH & Co. KG
Klaus-Gutsch-Str. 7
78628 Rottweil
Germany

NOTES ON WIRING AND CABLE ROUTING

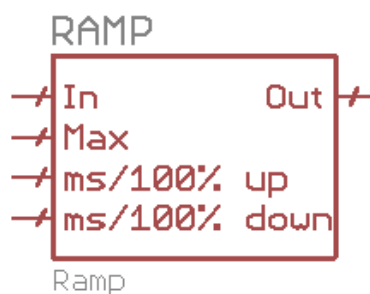
The controller must be appropriately protected against overload (see performance data)



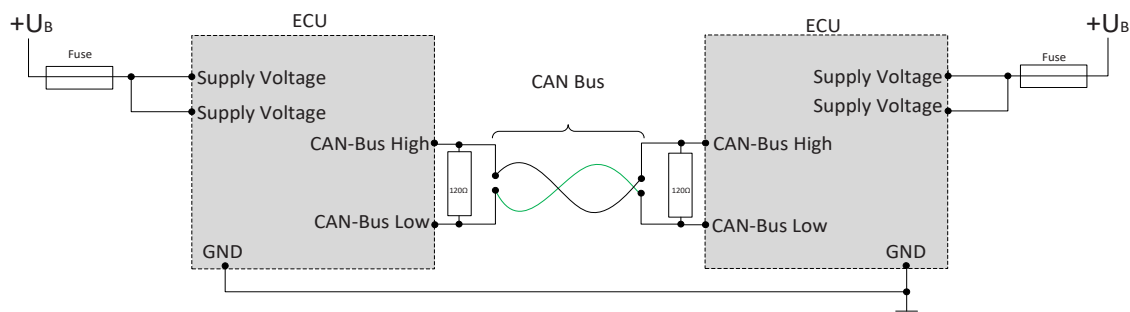
The full bridge motor outputs may only be interconnected against each other.



To prevent damage to the hardware, a ramp function, e.g. via the graphic programming block "Ramp", must be used. The description for this is stored in the Developers Studio.



CAN bus communication is the main communication between the control unit and the vehicle. Therefore, connect the CAN bus with special care and check the correct communication with the vehicle to avoid undesired behavior.



In order to achieve water resistance, not used pins (connectors or SMA connectors) need to be sealed with blind plugs or caps.

SAFETY AND INSTALLATION INFORMATION

It is essential to read the instructions in full thoroughly before working with the device.

Please note and comply with the instructions in the operating instructions and the information in the device data sheet, see www.mrs-electronic.com

Staff qualification: Only staff with the appropriate qualifications may work on this device or in its proximity.

SAFETY



WARNING! Danger as a result of a malfunction of the entire system.

Unforeseen reactions or malfunctions of the entire system may jeopardise the safety of people or the machine.

- Ensure that the device is equipped with the correct software and that the wiring and settings on the hardware are appropriate.



WARNING! Danger as a result of unprotected moving components.

Unforeseen dangers may occur from the entire system when putting the device into operation and maintaining it.

- Switch the entire system off before carrying out any work and prevent it from unintentionally switching back on.
- Before putting the device into operation, ensure that the entire system and parts of the system are safe.
- The device should never be connected or separated under load or voltage.



CAUTION! Risk of burns from the housing.

The temperature of the device housing may be elevated.

- Do not touch the housing and let all system components cool before working on the system.

PROPER USE

The device is used to control or switch one or more electrical systems or sub-systems in motor vehicles and machines and may only be used for this purpose. The device may only be used in an industrial setting.



WARNING! Danger caused by incorrect use.

The device is only intended for use in motor vehicles and machines.

- Use in safety-related system parts for personal protection is not permitted.
- Do not use the device in areas where there is a risk of explosion.

Correct use:

- operating the device within the operating areas specified and approved in the associated data sheet.
- strict compliance with these instructions and no other actions which may jeopardise the safety of individuals or the functionality of the device.

Obligations of the manufacturer of entire systems

It is necessary to ensure that only functional devices are used. If devices fail or malfunction, they must be replaced immediately.

System developments, installation and the putting into operation of electrical systems may only be carried out by trained and experienced staff who are sufficiently familiar with the handling of the components used and the entire system.

It is necessary to ensure that the wiring and programming of the device does not lead to safety-related malfunctions of the entire system in the event of a failure or a malfunction. System behaviour of this type can lead to a danger to life or high levels of material damage.

The manufacturer of the entire system is responsible for the correct connection of the entire periphery (e.g. cable cross sections, correct selection/connection of sensors/actuators).

Opening the device, making changes to the device and carrying out repairs are all prohibited. Changes or repairs made to the cabling can lead to dangerous malfunctions. Repairs may only be carried out by MRS.

Installation

The installation location must be selected so the device is exposed to as low a mechanical and thermal load as possible. The device may not be exposed to any chemical loads.

Install the device in such a manner that the plugs point downwards. This means condensation can flow off the device. Single seals on the cables/leads must be used to ensure that no water gets into the device.

Putting into operation

The device may only be put into operation by qualified staff. This may only occur when the status of the entire system corresponds to the applicable guidelines and regulations.

FAULT CORRECTION AND MAINTENANCE



NOTE The device is maintenance-free and may not be opened.

- If the device has damage to the housing, latches, seals or flat plugs, it must be taken out of operation.

Fault correction and cleaning work may only be carried out with the power turned off. Remove the device to correct faults and to clean it.

Check the integrity of the housing and all flat plugs, connections and pins for mechanical damage, damage caused by overheating, insulation damage and corrosion. In the event of faulty switching, check the software, switches and settings.

Do not clean the device with high pressure cleaners or steam jets. Do not use aggressive solvents or abrasive substances.