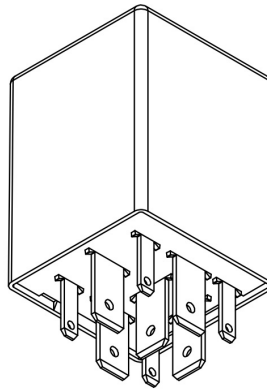


mounting direction



side view

DESCRIPTION

The Micro PLC CAN 4 I/O is a very small controller for automotive applications. The module is user configurable / programmable for a wide range of automotive applications. Control and data readout is via CAN bus.

TECHNICAL SPECIFICATION

| | |
|--------------------------------------------|-------------------------------------------------------------------------------------------------|
| Housing | Plastic PA66GF30 |
| Connector | 9-in bottom panel |
| Weight | 28 g |
| Temperature range acc. to ISO 16750-4 | -40 °C...+85 °C (at +85 °C not full load) |
| Environmental protection acc. to ISO 20653 | IP 6K8, when watertight socket is used and the mounting direction is correct |
| Current consumption | 24 mA (12 V); 26 mA (24 V) |
| Over-current Protection | 10 A |
| Total Inputs and outputs | 4 inputs/outputs (I/Os), 1 digital input |
| Inputs | Configurable as: Analog (0...11.4 V) Digital, positive encoder signals |
| Outputs | Configurable as: Digital, positiv switching (High-Side) PWM output (3 Hz...500 Hz) |
| Operating voltage | 9...32 V (Code C for 12 V, Code E for 24 V, acc. to ISO 16750-2) |
| Starting voltage | 8 V |
| Overvoltage protection | ≥ 33 V |
| Undervoltage cut-off | ≤ 6 V |
| Quiescent current | 300 µA (12 V); 460 µA (24 V) |
| Reverse polarity protection | yes |
| CAN Interfaces | CAN Interface 2.0 A/B ISO 11898-2:2006 |

REGULATORY APPROVALS AND TESTING

| | |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E1 approval | ECE R10 06 7199 |
| Electrical tests | Acc. to ISO 16750-2 or -4: Reverse Polarity Short circuit Long term overvoltage at T _{+60 °C} Storage Test at T _{+85 °C} and T _{-40 °C} Operation Test at T _{-40 °C} Superimposed alternating voltage Slow decrease and increase of the supply voltage Reset behavior at voltage drop Noise emission/immunity to ECE R10 Rev. 04 Cable-led interference emission to ECE R10 Rev. 04 Acc. to ISO 7637-2: Pulse 1, 2a, 2b, 3a, 3b and 4 |

SOFTWARE/PROGRAMMING

Programming System

MRS APPLICS STUDIO

The Applics 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, 5, 8 | | | Pin 4 | | |
|------------------------------------------------------|-----------------------------------|-----------------|------------------------------------------------------|-----------------------------------|-----------------|
| | Usable as analog or digital input | | | Usable as analog or digital input | |
| | Resolution | 12 Bit | | Resolution | 12 Bit |
| | Accuracy | ±1 % full scale | | Accuracy | ±1 % full scale |
| Voltage input 0...11.4 V (see A) | Input resistance | 17.6 kΩ | Voltage input 0...11.4 V (see A) | Input resistance | 22.6 kΩ |
| | Input frequency | 60 Hz | | Input frequency | 60 Hz |
| | Accuracy | ±3 % | | Accuracy | ±3 % |
| Digital input Positive (see B) | Input resistance | 17.6 kΩ | Digital input Positive (see A) | Input resistance | 22.6 kΩ |
| | Input frequency | | | Input frequency | |
| | Turn-on threshold | 6.5 V | | Turn-on threshold | 6.5 V |
| | Turn-off threshold | 4.9 V | | Turn-off threshold | 4.9 V |

¹ cutoff frequency (-3 dB)

OUTPUT FEATURES - SUMMARY

| | | |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pin 1, 3, 5, 8 | Protective circuit for inductive loads | integrated |
| | Wire fault diagnostics | Possible via current sense |
| | Short circuit diagnostics | Possible via current sense |
| Digital, positive switching (high side; see B) | Switching voltage Switching current Internal current sense | 9...32 V DC 0.02...2.5 A Via signal AI_I_87, AI_I_87A, AI_I_C, AI_I_X To obtain calibrated values, the directive #define ADC_CAL_ENABLE must be set in the header file user_code.h. Calibrated values can be activated / deactivated via ALG_CAL_STATE in MRS Applics Studio |
| PWM-output (see C) | Output frequency Duty cycle Resolution Switching current | 3...500 Hz 0...1000 % 1 ‰ up to 2.5 A frequency set via one timer channel, duty cycle selectable per output |
| Short circuit protection against GND and U _B | Internal overtemperature protection, latch-off can be realized by software application | |

PERFORMANCE TEST OUTPUTS AT T_{MAX}

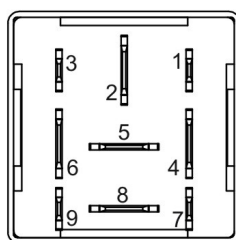
| Test without PWM | Test No. | Load | Duration |
|------------------|----------|----------------------------------|-----------|
| | 1 | 4 x 2 A | permanent |
| | 2 | 1 x 2.5 A (87A); 2 x 1 A (X, 87) | 30 min |
| | 3 | 1 x 3 A (87) | 15 min |

PIN ASSIGNMENT POWER SUPPLY AND INTERFACES

| Pin | Pin description | Pin | Pin description |
|-----|-----------------------------------------------------------|-----|-----------------|
| 2 | Contact 30 / Supply voltage | 7 | CAN-H |
| 4 | Contact 15 / battery / ignition / analog or digital input | 9 | CAN-L |
| 6 | Contact 31 / Ground | | |

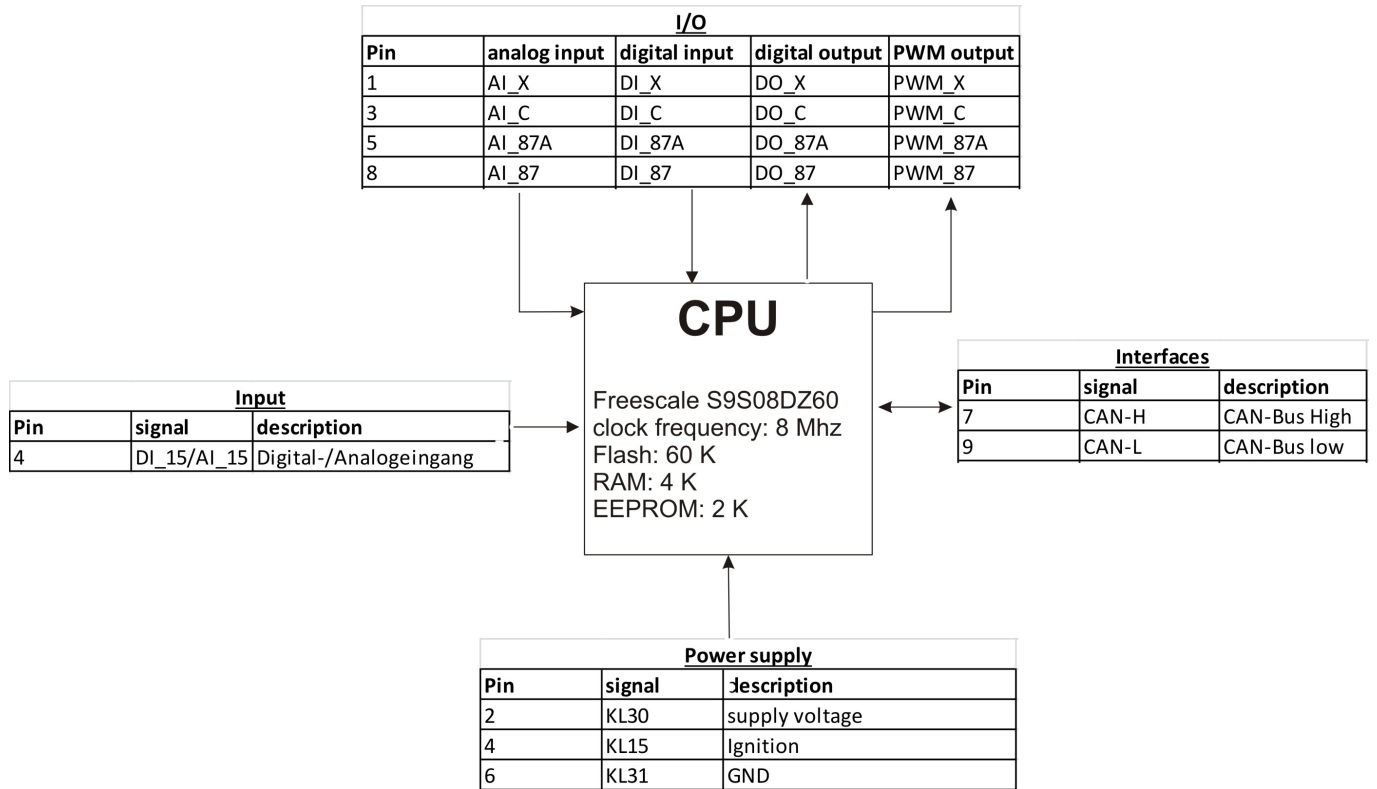
PIN ASSIGNMENT INPUTS AND OUTPUTS

| Pin | Programm signal | Pin description | Pin | Programm signal | Pin description |
|-----|-----------------|--------------------------------------------------------------------------------------------|-----|-----------------|------------------------------------------------------------------------------------------------|
| 1 | X | Analog/digital input X 0...11.4 V or digital output X with PWM option and read off current | 5 | 87A | Analog/digital input 87A 0...11.4 V or digital output 87A with PWM option and read off current |
| 3 | C | Analog/digital input C 0...11.4 V or digital output C with PWM option and read off current | 8 | 87 | Analog/digital input 87 0...11.4 V or digital output 87 with PWM option and read off current |

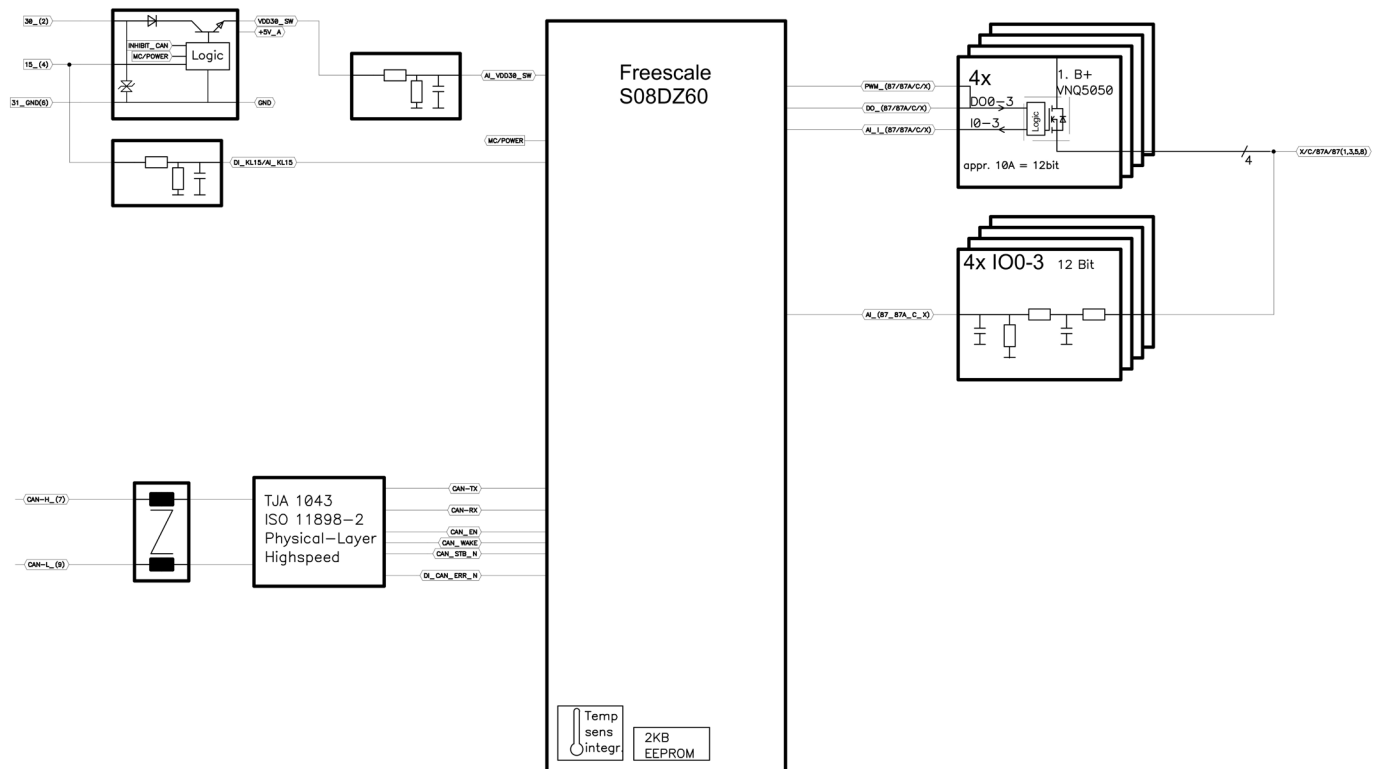


bottom view

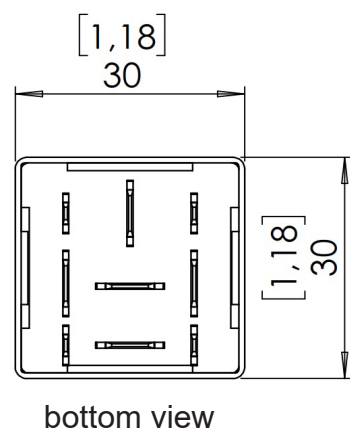
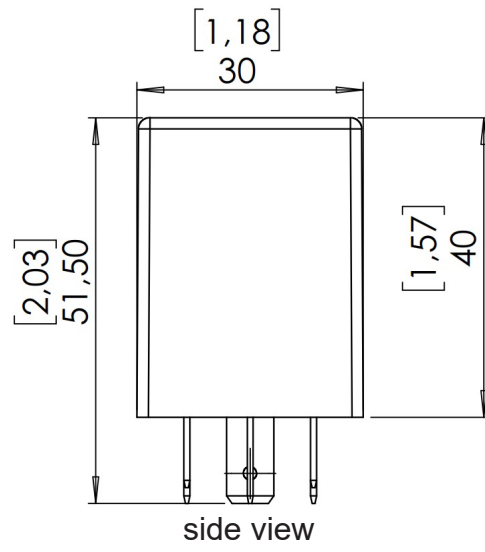
PIN FEATURE MAP



BLOCK FUNCTION DIAGRAM



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



ASSEMBLY OPTIONS AND ORDER INFORMATION

| | Inputs | | Outputs | CAN Bus | | Remarks |
|----------------------|----------------------------|-----------------------------------------------------------------------|-------------------|------------|-----------|---------|
| | A Voltage 0...11.4 V | B I/O's (optional as analog/digital input or digital output) | C PWM ≤ 500 Hz | High-Speed | Low-Speed | |
| 1.111.311.00 | 1, 3, 5, 8 | 1, 3, 5, 8 | 1, 3, 5, 8 | X | | |
| 1.111P.311.00 | 1, 3, 5, 8 | 1, 3, 5, 8 | 1, 3, 5, 8 | X | | CANopen |

ACCESSORIES

| Description | Order number |
|-------------------------------------------------------------|--------------|
| Softwaretool MRS Applics Studio | 1.100.200.01 |
| Socket ST FL 9-pin 5x6.3 / 4x2.8 | 1.017.002.00 |
| Socket package watertight 40 mm | 1.017.010.40 |
| Cable set to programm Micro PLC CAN / Prop CAN | 109446 |
| FASTON terminal for latching 6.3 mm 1.5-2.5 mm ² | 103064 |
| FASTON terminal for latching 6.3 mm 1 mm ² | 102355 |
| FASTON terminal for latching 2.8 mm 0.5-1.0 mm ² | 105292 |
| Housing bracket | 1.017.080.00 |
| PCAN-USB Interface | 105358 |

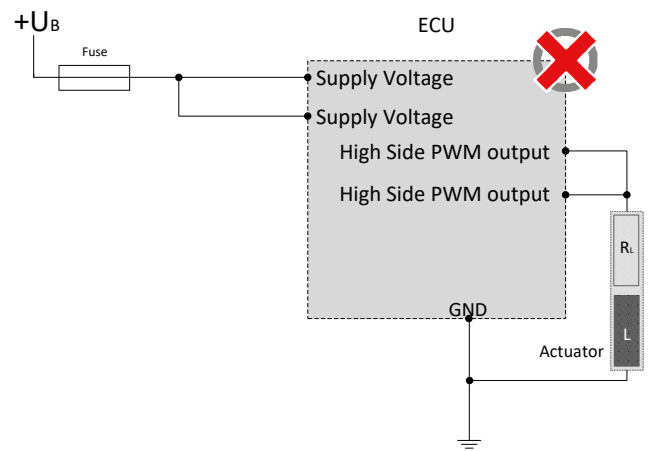
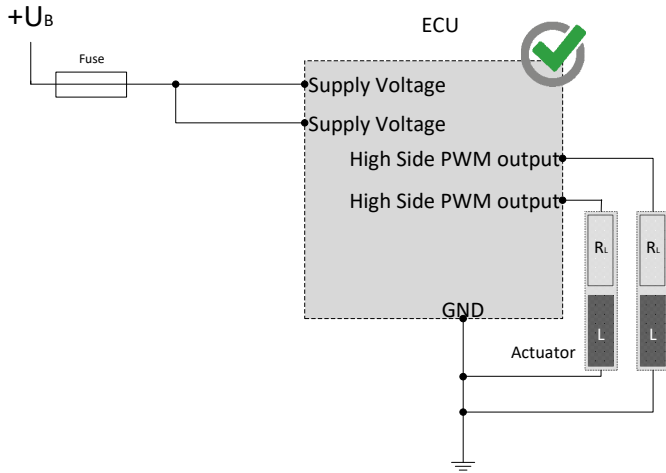


MANUFACTURER

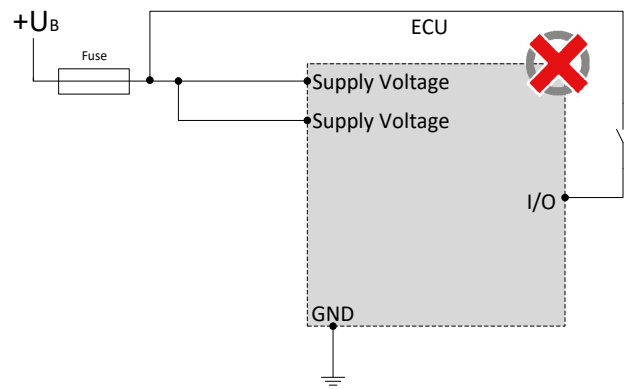
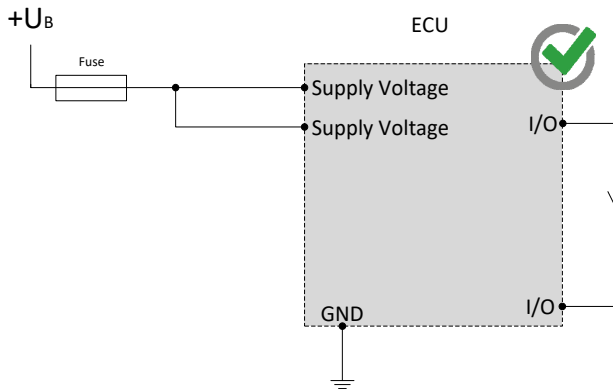
MRS Electronic GmbH & Co. KG
Klaus-Gutsch-Str. 7
78628 Rottweil
Germany

NOTES ON WIRING AND CABLE ROUTING

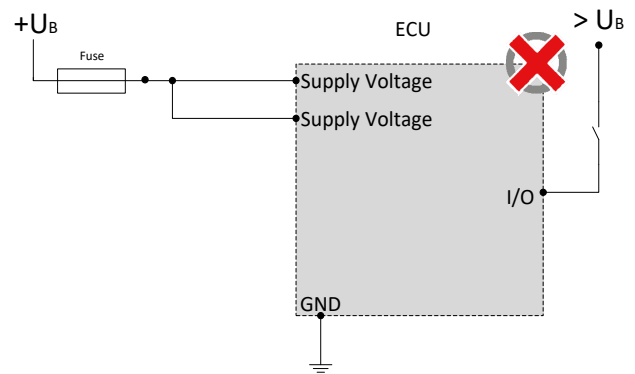
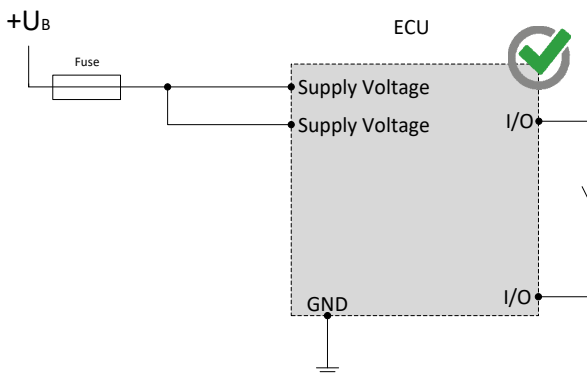
PWM outputs may not be connected with each other or bypassed.



The pins (I/Os) can be used in combination and may not be switched externally against supply voltage.

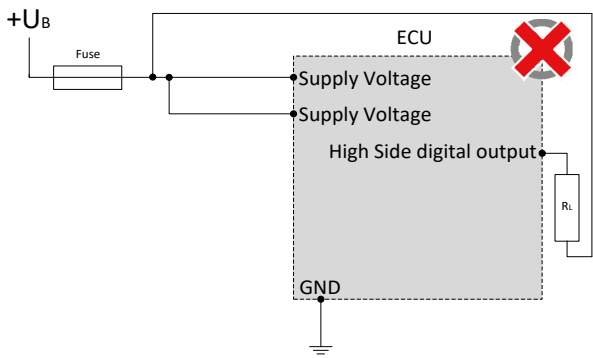
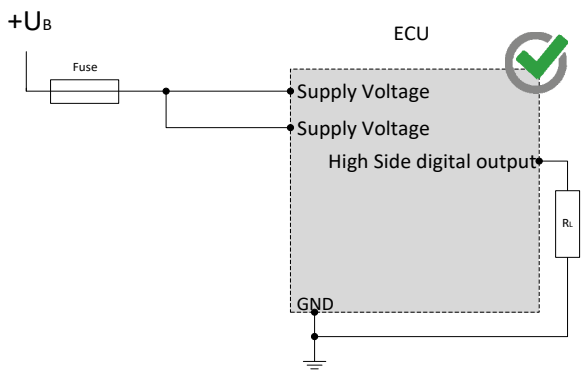
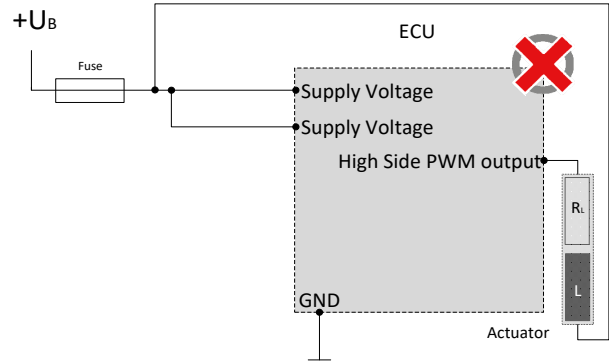
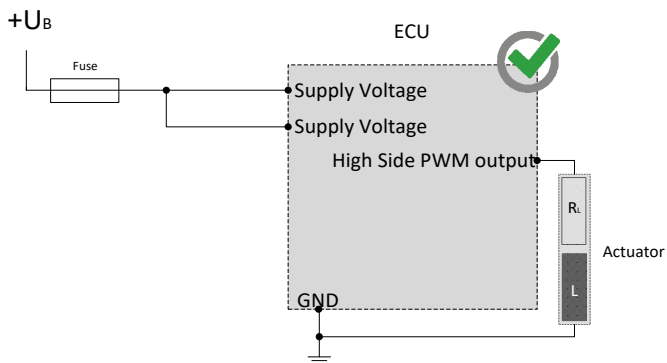


The pins (I/Os) can be used in combination and may not be switched externally against a higher voltage level than supply voltage.

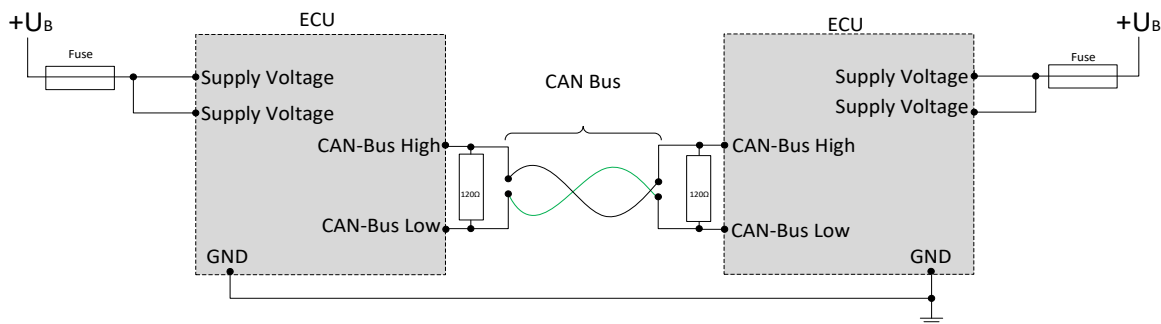


NOTES ON WIRING AND CABLE ROUTING

Higside outputs may only be switched to ground.



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.



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.