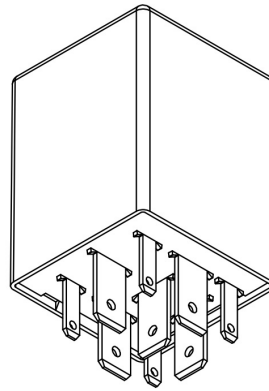


mounting direction



view of plug

## DESCRIPTION

The Micro PLC CAN 4 ANA is a miniature controller for automotive applications with 4 analog inputs and outputs, which can be configured to measure current, frequency and voltage. All data can be conveniently sent and read out via the CAN bus interface.

## TECHNICAL SPECIFICATION

Housing	Plastic PA66GF30
Connector	Base plate 9-pin
Weight	28 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)
Current consumption	35 mA (at 12 V) 40 mA (at 24 V)
Over-current Protection	Current consumption + load current
Total Inputs and outputs	4
Inputs	<b>Configurable as:</b> Analog input (0...12.5 V/0...36 V) Digital input Current input (0...24/31 mA) Frequency input
Outputs	<b>Configurable as:</b> Constant voltage source Analog voltage output
Supply voltage	9...32 V (Code C for 12 V, Code E for 24 V, acc. to ISO 16750-2)
Overvoltage protection	≥ 33 V
Quiescent current	20 µA (at 12 V and 24 V)
Reverse polarity protection	yes
CAN Interfaces	Highspeed 2.0 A/B according to ISO 11898-2

## REGULATORY APPROVALS AND TESTING

E1 approval	10 R - 05 7522
Electrical tests	<b>Acc. to ISO 16750-2 or -4:</b> Supply voltage test Long-term overvoltage at $T_{65\text{ °C}}$ Short circuit signal lines Short circuit in load circuits Reverse voltage Pin interruption Interruption Connector Storage test $T_{\text{max}}$ and $T_{\text{min}}$ Operation test $T_{\text{max}}$ and $T_{\text{min}}$ Starting profile  <b>Acc. to ISO 7637:</b> Car pulses 1 to 3b to ECE R10

## 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			Pin 5, 8		
	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...12.5 V (see <a href="#">A</a> ) <sup>1</sup>	Input resistance	44 kΩ	Voltage input 0...12.5 V (see <a href="#">A</a> ) <sup>1</sup>	Input resistance	80 kΩ
	Input frequency <sup>2</sup>	$f_g = 30 \text{ Hz}$		Input frequency <sup>2</sup>	$f_g = 30 \text{ Hz}$
	Accuracy	$\pm 3 \%$		Accuracy	$\pm 3 \%$
	Conversion factor	3 (33 Digits $\approx$ 100 mV, S.5)		Conversion factor	3 (33 Digits $\approx$ 100 mV, S.5)
Voltage input 0...36 V (see <a href="#">B</a> ) <sup>1</sup>	Input resistance	29 kΩ	Voltage input 0...36 V (see <a href="#">B</a> ) <sup>1</sup>	Input resistance	54 kΩ
	Input frequency <sup>2</sup>	$f_g = 75 \text{ Hz}$		Input frequency <sup>2</sup>	$f_g = 75 \text{ Hz}$
	Accuracy	$\pm 3 \%$		Accuracy	$\pm 3 \%$
	Conversion factor	8,8 (12 Digits $\approx$ 100 mV, S.5)		Conversion factor	8,8 (12 Digits $\approx$ 100 mV, S.5)
Digital input <sup>1</sup>	Input resistance	29 kΩ	Digital input <sup>1</sup>	Input resistance	54 kΩ
	Turn-on threshold (12.5 V)	7 V		Turn-on threshold (12.5 V)	7 V
	Turn-off threshold (12.5 V)	5.5 V		Turn-off threshold (12.5 V)	5.5 V
	Turn-on threshold (36 V)	20.5 V		Turn-on threshold (36 V)	20.5 V
	Turn-off threshold (36 V)	15.6 V		Turn-off threshold (36 V)	15.6 V
Current input 0...24/31 mA (see <a href="#">C</a> ) <sup>3</sup>	Input resistance	500 Ω	Current input 0...24/31 mA (see <a href="#">C</a> ) <sup>3</sup>	Input resistance	500 Ω
	Conversion factor 0...24 mA	$\approx 0.0059$ (1695 Digits $\approx$ 10 mA)		Conversion factor 0...24 mA	$\approx 0.0059$ (1695 Digits $\approx$ 10 mA)
	0...31 mA	$\approx 0.0175$ (580 Digits $\approx$ 10 mA)		0...31 mA	$\approx 0.0175$ (580 Digits $\approx$ 10 mA)
Frequency input (see <a href="#">D</a> ) <sup>4</sup>	Input resistance	29 kΩ	<sup>1</sup> Defined voltage signals must always be applied to pins that are configured as analog or digital inputs. Otherwise, they may be in an undefined state and cause malfunctions. <sup>2</sup> cutoff frequency (-3 dB) <sup>3</sup> Switching via measuring range <sup>4</sup> When programming via C-code, both frequency inputs can be read in parallel.		
	Accuracy	Up to 4.3 kHz max. $\pm 3 \%$			
	Turn-on threshold (12.5 V)	7 V			
	Turn-off threshold (12.5 V)	5.5 V			
	Turn-on threshold (36 V)	20.5 V			
	Turn-off threshold (36 V)	15.6 V			

## CONFIGURATION OF INPUTS

Desired Configuration	Setting via
Voltage input 0...12.5 V	DO_I_NAME = 0, DO_30V_10V_NAME = 0, PWM_20MA_NAME = 0
Voltage input 0...36 V	DO_I_NAME = 0, DO_30V_10V_NAME = 1, PWM_20MA_NAME = 0
Analog voltage output / current input	DO_I_NAME = 1, PWM_20MA_NAME (0...100% = 0... $U_{B-3V}$ <sup>5</sup> )
Current output	DO_I_NAME = 0, PWM_20MA_NAME (0...100% = 0...25 mA)
Frequency input (X and C)	Reading of the input frequency via FREQ_NAME

<sup>5</sup> applies up to a maximum output voltage of 12 V, which corresponds to an supply voltage of approx. 15 V.

OUTPUT FEATURES - SUMMARY

**Pin 1, 3, 5, 8  
(X, C, 87A, 87)**

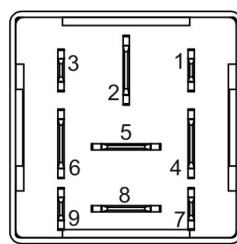
Digital, positive switching	Switching voltage	UB <sub>-3V</sub>
	Switching current	25 mA
	Analog voltage output	Deviation ± 3 %

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	9	CAN-L
6	Contact 31 / Ground		

PIN ASSIGNMENT INPUTS AND OUTPUTS

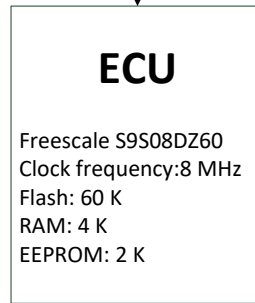
Pin	Programm signal	Pin description	Pin	Programm signal	Pin description
1	DI_X	Digital input X	5	DI_87A	Digitale input 87A
	AI_X	Analog input X		AI_87A	Analog input 87A
	DO_30V_10V_X	Range selection 12.5/36 V		DO_30V_10V_87A	Range selection 12.5/36 V
	DO_I_X	Current sink X		DO_I_87A	Current sink 87A
	PWM_20MA_X	Current output X		PWM_20MA_87A	Current output 87A
	FREQ_X	Analog voltage output Frequency input X			
3	DI_C	Digital input C	8	DI_87	Digital input 87
	AI_C	Analog input C		AI_87	Analog input 87
	DO_30V_10V_C	Range selection 12.5/36 V		DO_30V_10V_87	Range selection 12.5/36 V
	DO_I_C	Current sink C		DO_I_87	Current sink 87
	PWM_20MA_C	Current output C		PWM_20MA_87	Current output 87
	FREQ_C	Analog voltage output Frequency input C			



bottom view

PIN FEATURE MAP

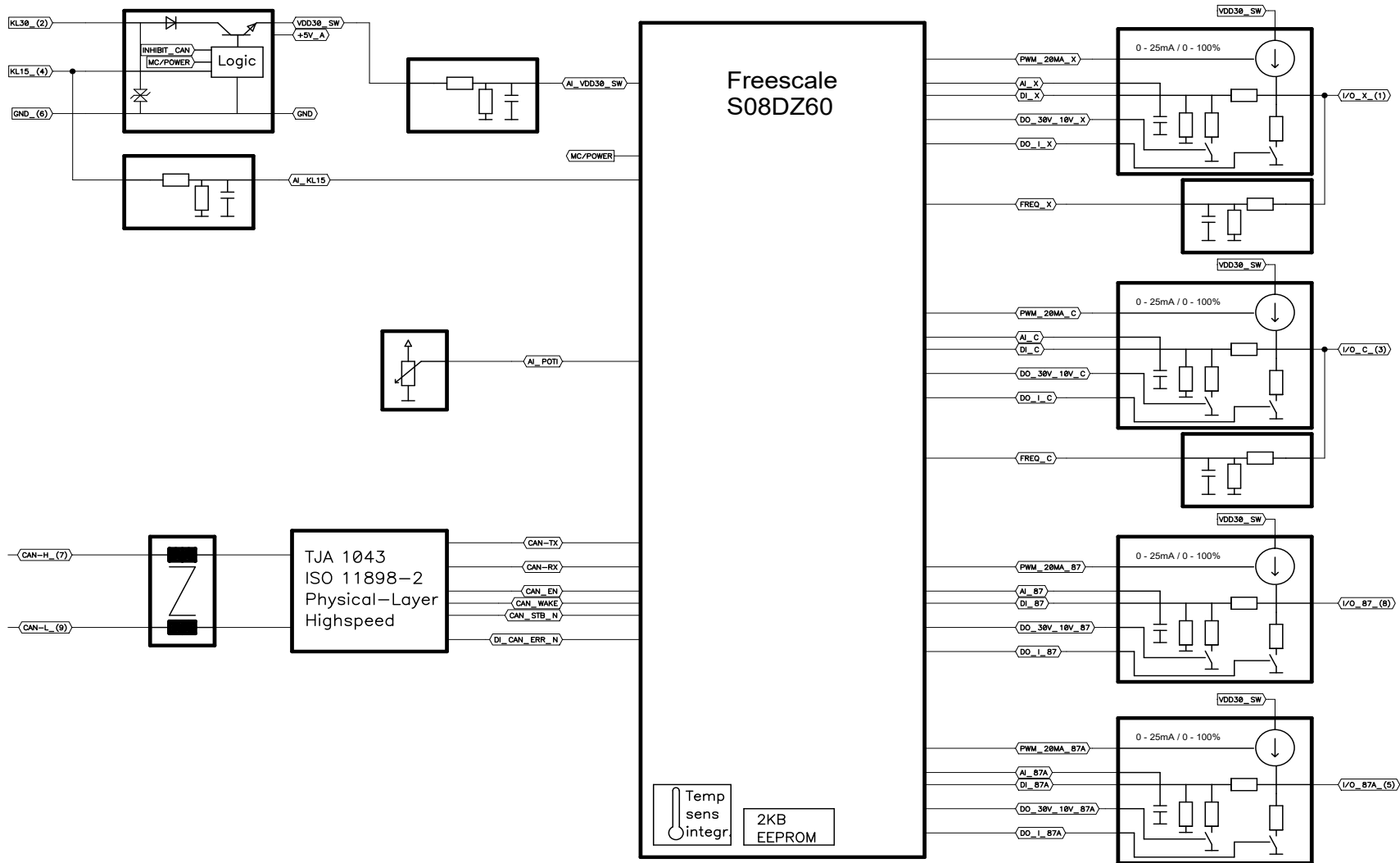
analog/digital inputs/outputs						
Pin	Digital Input	Analog Input	Range select	Current sink	Frequency	Current-/Analogvoltage output
1	DI_X	AI_X	DO_30V_10V_X	DO_I_X	FREQ_X	PWM_20MA_X
3	DI_C	AI_C	DO_30V_10V_C	DO_I_C	FREQ_C	PWM_20MA_C
5	DI_87A	AI_87A	DO_30V_10V_87A	DO_I_87A		PWM_20MA_87A
8	DI_87	AI_87	DO_30V_10V_87	DO_I_87		PWM_20MA_87



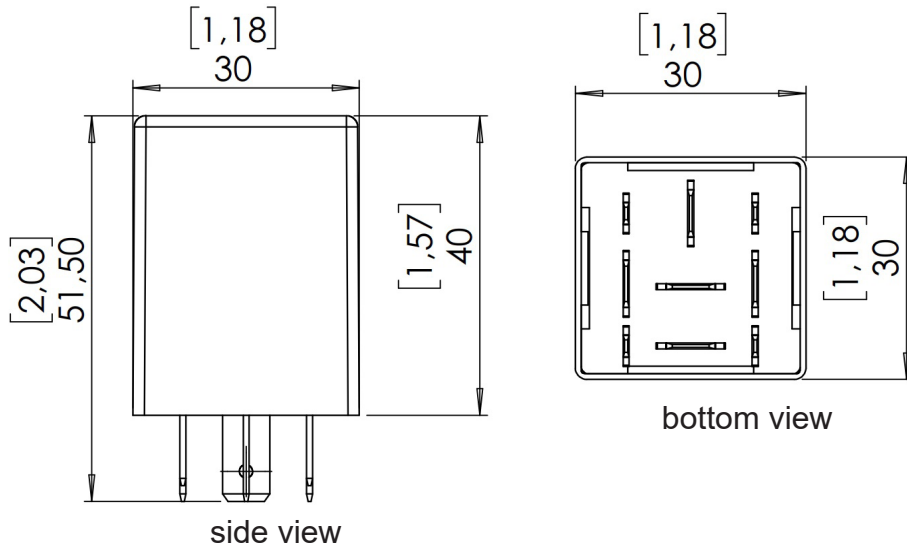
Interfaces		
Pin	Signal	Description
7	CAN-H	CAN Bus high
9	CAN-L	CAN Bus low

Power Supply		
Pin	Signal	Description
2	KL30	Supply voltage
4	KL15	Ignition
6	-	GND

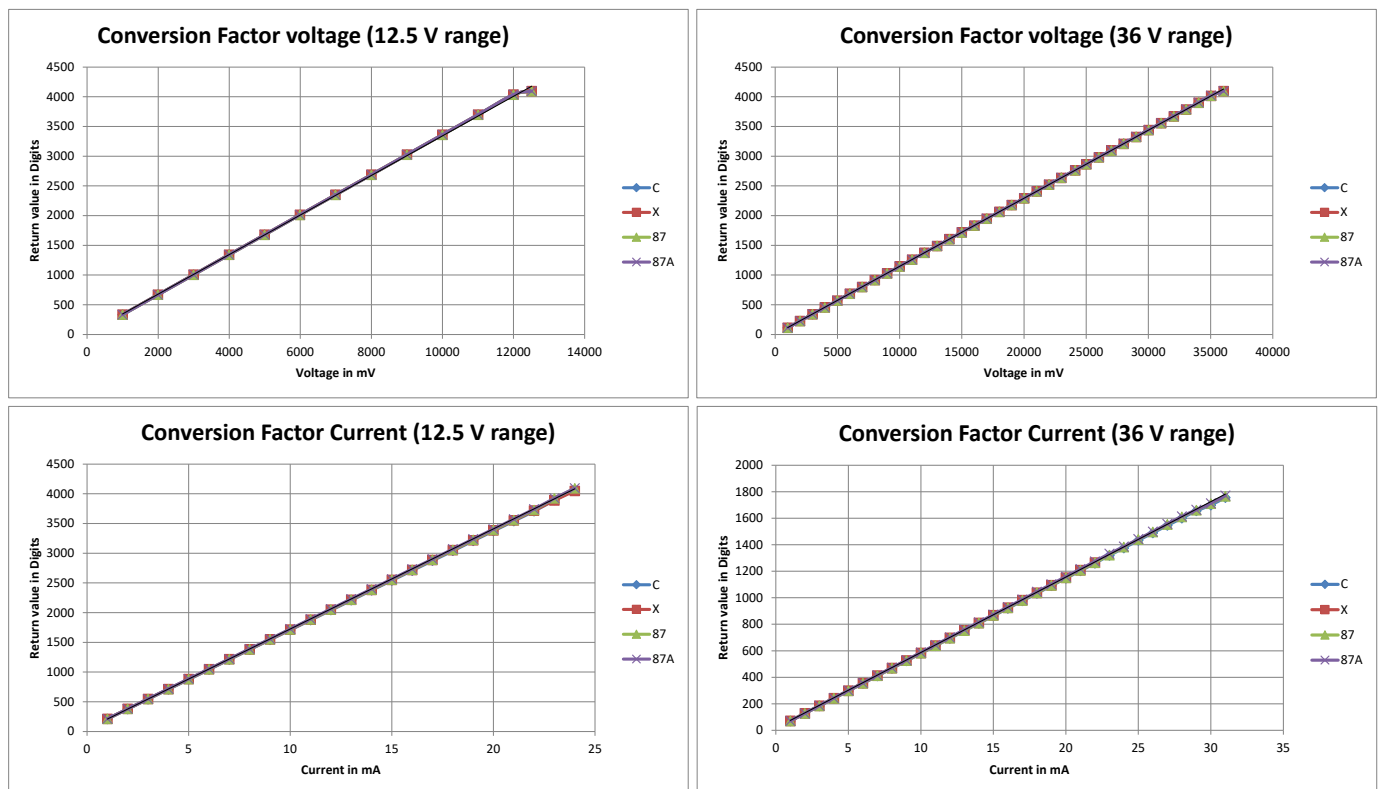
BLOCK FUNCTION DIAGRAM



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



CONVERSION FACTOR



## ASSEMBLY OPTIONS AND ORDER INFORMATION

Order number	Pin numbering of the inputs				CAN Bus	Remarks
	A Voltage 0...12.5 V	B Voltage 0...36 V	C Current 0...31 mA	D Frequency 0...4.3 kHz		
<b>1.112.300.00</b>	1,3,5,8	1,3,5,8	1,3,5,8	1,3	X	
<b>1.112P.300.00</b>	1,3,5,8	1,3,5,8	1,3,5,8	1,3	X	CANopen

SCIP-number: 09a6e447-a7d3-45df-8198-df83228e8c33

## ACCESSORIES

Description	Order number
Softwaretool MRS Applics Studio	1.100.200.01
Cable set to programm CAN 4 ANA	109446
Socket ST FL 9-pin 5x6.3 / 4x2.8	1.017.002.00
Socket package watertight 40 mm	1.017.010.40
FASTON terminal for latching 6.3 mm 1.5-2.5 mm <sup>2</sup>	103064
FASTON terminal for latching 6.3 mm 1.0 mm <sup>2</sup>	102355
FASTON terminal for latching 2.8 mm 0.5-1.0 mm <sup>2</sup>	105292
Housing bracket	1.017.08.00
PCAN-USB Interface	105358

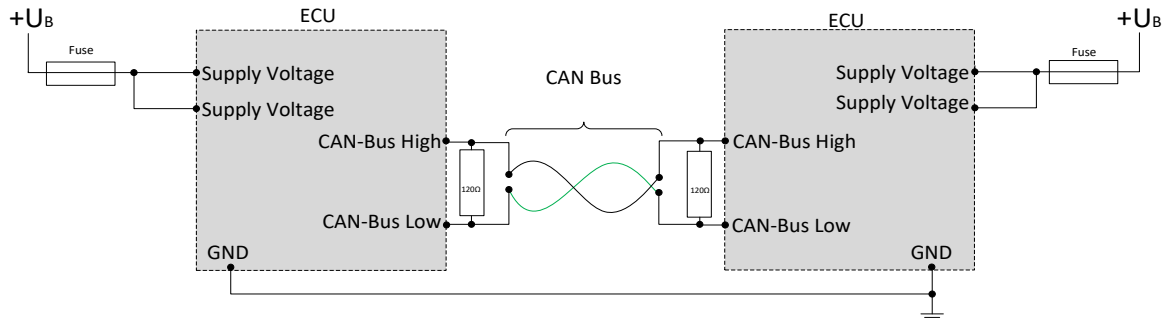


## MANUFACTURER

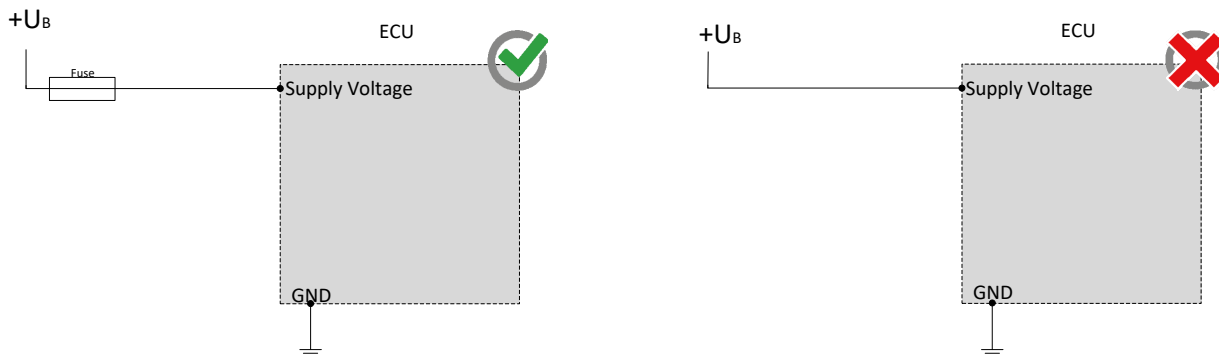
MRS Electronic GmbH & Co. KG  
Klaus-Gutsch-Str. 7  
78628 Rottweil  
Germany

NOTES ON WIRING AND CABLE ROUTING

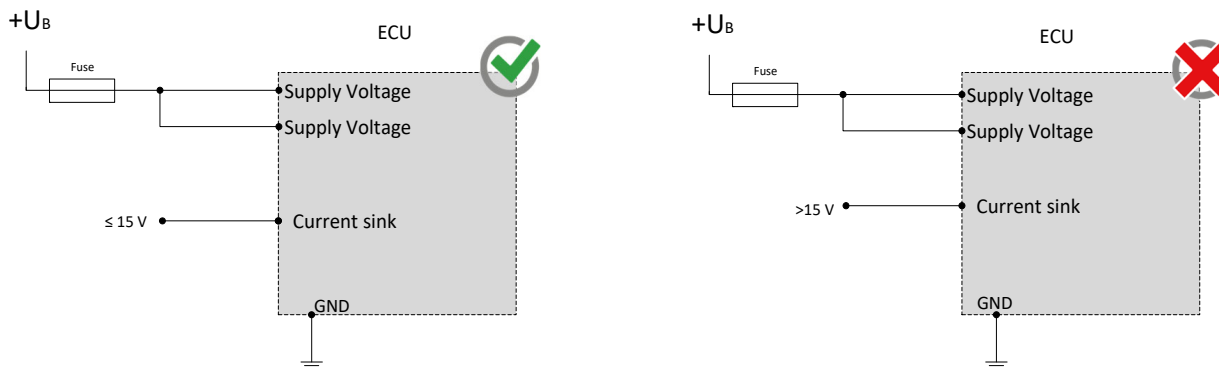
CAN bus communication is the main communication between the control unit and the vehicle. Therefore, connect the CAN bus with special care and check the correct communication with the vehicle to avoid undesired behavior.



The control must be protected against overload (see performance data)



When using the input with pull-down resistance (using DO\_I\_C/X/87/87A), you must not connect a greater voltage than 15 V to the input.



## 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](http://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.