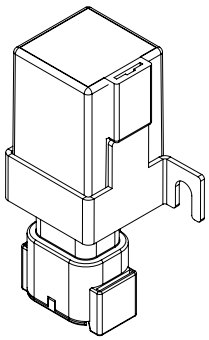
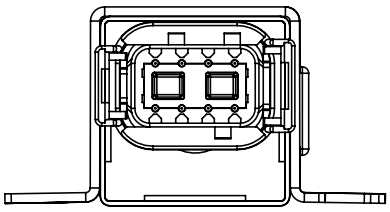


mounting direction



view of plug

DESCRIPTION

The Micro PLC CAN is a small control system for automotive applications.
Free configuration and programmability offer a wide range of applications in the automotive sector. Control and readout are done via the CAN bus (ISO 11898-2). Freescale Processor with Flash technology (option of multiple programming).

TECHNICAL DATA

Housing	Plastic PA66GF30
Connector	DEUTSCH DTM04-08PA
Weight	75 g
Temperature range (ISO 16750-4 compliant)	-40°C up to +85 °C (at +85 °C not full load)
Environmental Protection	IP 6K8 in the correct installation position (plug down)
Current consumption	**Depending on assembly:** 23...27 mA
Over-current protection	1A + load
Total Inputs and outputs	**Depending on assembly:** 4 (2 inputs, 2 outputs) or 5 (2 inputs, 2 outputs)
Inputs	**Depending on assembly:** Analog input (0…11,4 V) Digital, positive encoder signals
Outputs	**Depending on assembly:** Digital, positive switching PWM output (3 Hz…500 Hz)
Operating voltage	**Depending on assembly:** 12 V (Code C) and/or 24 V (Code F) acc. to ISO 16750 – 2
Starting voltage	8,5 V (12 V variant) 16 V (24 V variant)
Overvoltage protection	≥ 33 V
Quiescent current	not available
Reverse polarity protection	Yes
CAN interface	CAN interface 2.0 A/B, ISO 11898-2:2003

REGULATORY APPROVALS AND TESTING

E1 approval	ECE R10 05 7362
Temperature range (ISO 16750-4 compliant)	Gem. ISO 16750 – 2 bzw. -4: Short circuit protection Jump start (12 V variante) Reverse polarity Interruption pin and connector Longtime overvoltage at TMax-20 °C Storage test at TMax and TMin Operation test at TMax and TMin Superimposed alternating voltage Slow decrease and increase of supply voltage Short-term voltage drop Reset behavior in case of voltage drop Acc to. ISO 7637 - 2: Puls 1, 2a, 2b, 3a, 3b

SOFTWARE/PROGRAMMING

Programming system

MRS Developers Studio
MRS Developers Studio with built-in functions library, similar programming with FUP. Custom software blocks can be integrated into “C-code”. Program memory is sufficient for about 300 basic logic components.

INPUT FEATURES - SUMMARY

Pin C (8 only at S42 and S44)	Programmable as analog or digital input Resolution Accuracy	 12 Bit ± 1% full scale
Voltage input 0…11.4 V (see A)	Input resistance Input frequency Accuracy	21,4 kΩ fg[1]= 65 Hz ± 2 %
Digital input Positive (see B)	Input resistance Input frequency Turn-on threshold Turn-off threshold	21,4 kΩ fg[1]= 65 Hz 6,5 V 5 V

[1] Cutoff frequency (-3 dB)

Pin 15 (5)[2]	Programmable as analog or digital input Resolution Accuracy	 12 Bit ± 1% full scale
Voltage input 0…11.4 V (see A)	Input resistance Input frequency Accuracy	21,4 kΩ fg[1]= 65 Hz ± 10 %
Digital input Positive (see B)	Input resistance Input frequency Turn-on threshold Turn-off threshold	21,4 kΩ fg[1]= 65 Hz 6,7 V 6,6 V

Pin X (2 at S44 and 8 at S43)	Programmable as analog or digital input Resolution Accuracy	 12 Bit ± 1% full scale
Voltage input 0…11.4 V (see A)	Input resistance Input frequency Accuracy	22,6 kΩ f_g[1]= 60 Hz ± 2 %
Digital input Positive (see B)	Input resistance Input frequency Turn-on threshold Turn-off threshold	22,6 kΩ f_g[1]= 60 Hz 6,5 V 5 V
Frequency input (see E)	Input resistance Input frequency Turn-on threshold Turn-off threshold	22,6 kΩ ≤ 2.2 kHz 6,5 V 5 V

OUTPUT FEATURES - SUMMARY

Pin C (8)		
Digital output (open collector output)	max. performance	2 W[3]
	Protective circuit against inductive loads	not available, must be fused externally (free-wheeling diode)

Pin 87 (3), 87A (2) Relay variant (S43/S44)		
Load current (Relay, see F)	NO NC (only S43)	15 A 10 A
	Fuse protection	15 A

Pin 87 (3), 87A (2) Highside driver-variant VNQ5050	Wire fault diagnostics	Possible via current sense
	Short circuit diagnostics	Possible via current sense
Digital, positive switching (high side; see C)	Switching voltage Switching current	9-32 V DC see endurance tests
	Current sense via	(ANA_I_OUT_87A ANA_I_OUT_87)
	Fusing	load-dependent

[2] For variants with quiescent current and activated DO_POWER or CAN INH, the values may differ.
[3] When using an LED, it glows due to the leakage current even when switched off.

ENDURANCE TEST HIGH-SIDE DRIVER VNQ5050 AT T_{MAX}= 85 °C

Measurement No.	87	87A	Total current	Passed
1	2,5 A	2,5 A	5 A	yes
2	3,5 A	3,5 A	7 A	yes
3	4 A	4 A	8 A	yes
4	4,5 A	4,5 A	9 A	yes
5	3 A	5 A	8 A	yes
6	6 A	2 A	8 A	yes
7	5 A	5 A	10 A	no, not suitable for the long term

PIN ASSIGNMENT POWER SUPPLY AND INTERFACES

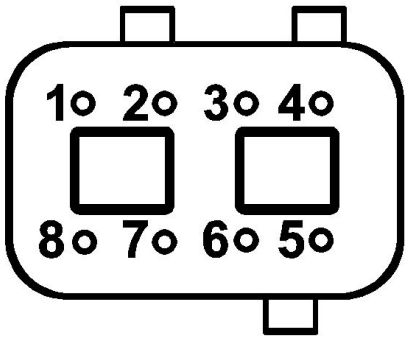
Pin	Description
1	Ground
4	Operationg voltage
5	Contact 15/ignition/analog-digital input

Pin	Description
6	CAN bus low
7	CAN bus high

PIN ASSIGNMENT INPUTS AND OUTPUTS (DEPENDING ON ASSEMBLY)

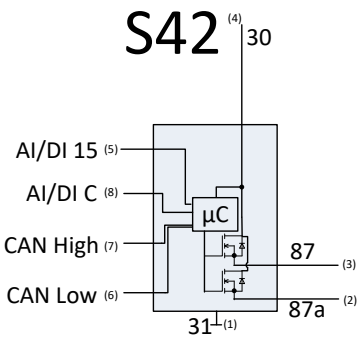
Pin	Signal	Description
2	OUT_87A ANA_I_OUT_87A	NC Output of relay or HSD output 87A with current sense
3	OUT_87 ANA_I_OUT_87 at S44: ANA_X D_ANA_X	NO output of relay or HSD output 87 with current sense Analog input X 0...11,4 V or Digital input X or Frequency input
5	ANA_15 D_ANA_15	Analog input 15 0...11.4V or Digital input 15

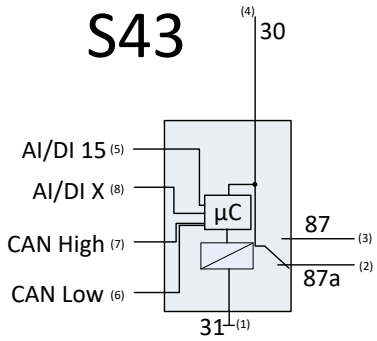
Pin	Signal	Description
8	ANA_C D_ANA_C C at S43: ANA_X D_ANA_X	Analog input C 0...11,4 V or Digital input C or Digital output C (max. 2W) Analog input X 0...11,4 V or Digital input X or Frequency input

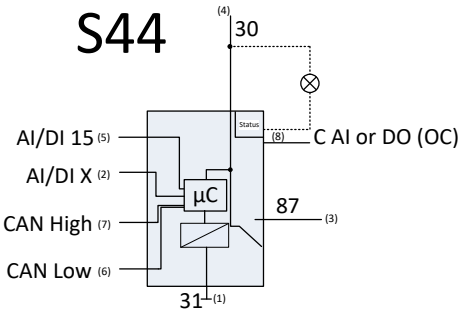


Pin assignment, bottom view

CONNECTION DIAGRAMS







PIN FEATURE MAP

Interfaces

Pin	Signal	Description
7	CAN-H	CAN bus high
6	CAN-L	CAN bus low

HSD outputs (only at assembly variant S42)

Pin	Signal	Description
2	OUT_87A	HSD output
3	OUT_87	HSD output

Analog inputs (depends on assembly)

Pin	Signal	Description
2	ANA_X/D_ANA_X	0-11.4 V/DI/PWM (only at assembly variant S44)
5	ANA_15/D_ANA_15	0-11.4 V/DI
8	ANA_C/D_ANA_C or ANA_X/D_ANA_X	0-11.4 V/DI (only at assembly variants S42/S44) 0-11.4 V/DI/PWM (only at assembly variant S43)

ECU

Freescale S08DZ60
Clock frequency: 4 MHz
Flash: 60 K
RAM: 4 K
EEPROM: 2 K

Relay outputs (depends on assembly)

Pin	Description
2	Relay 87A NC (only S43)
3	Relay 87 NO (S43/S44)

Open collector outp. (only assembly variant S44)

Pin	Signal	Description
8	C	Digital output, 2W max.

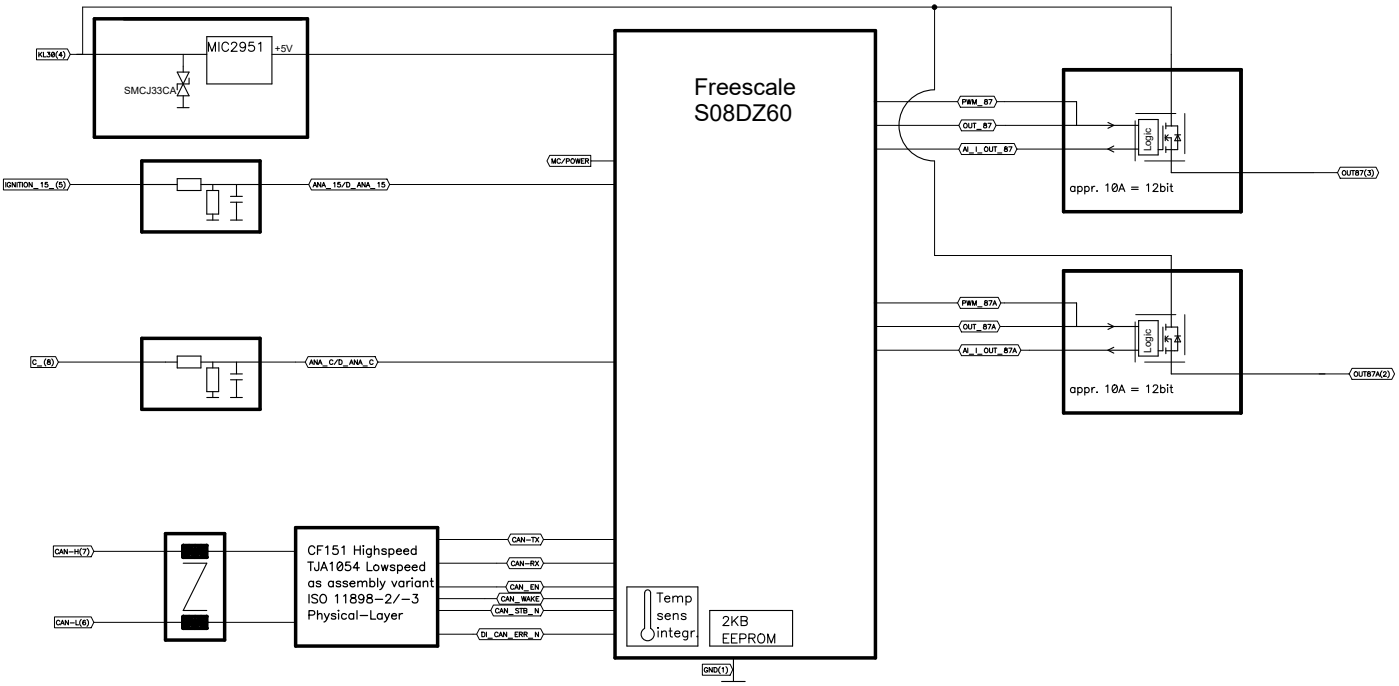
Interfaces

Pin	Signal	Description
6	CAN_L	CAN bus low
7	CAN_H	CAN bus high

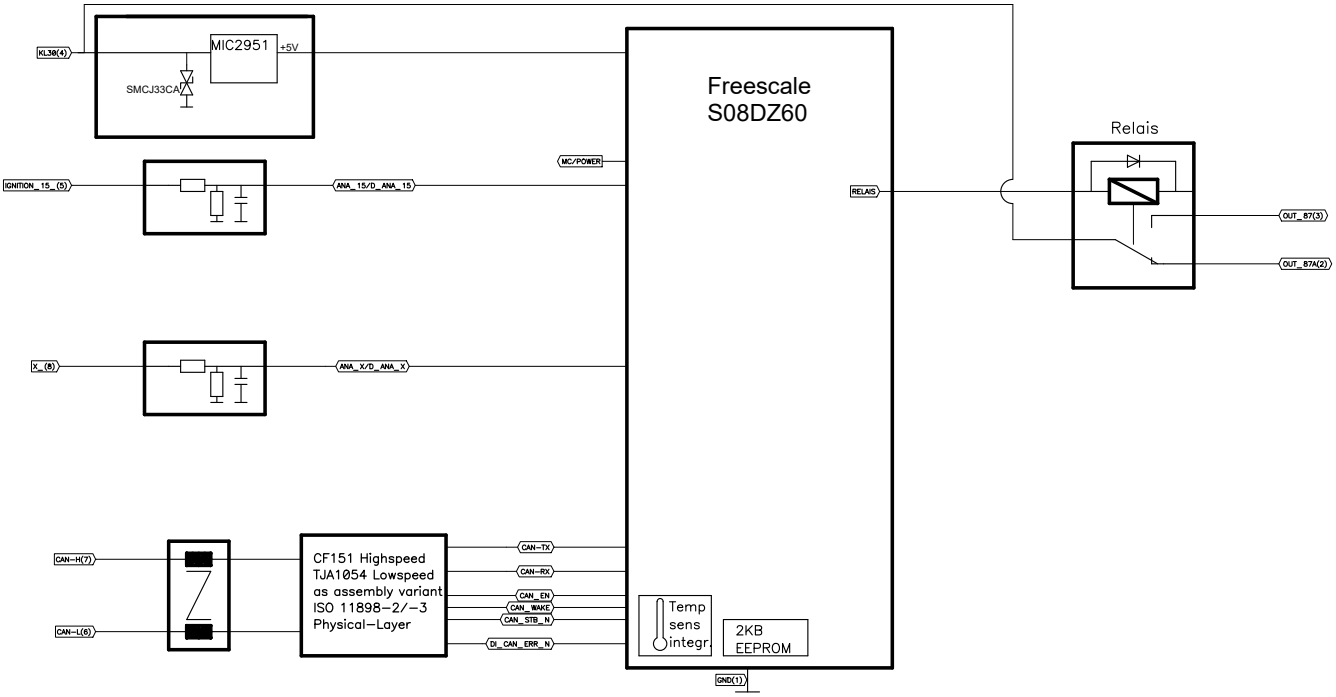
Power Supply

Pin	Signal	Description
1		Ground/contact 31 according to DIN 72552
4		Supply voltage/contact 30 according to DIN 72552
5	KL15	Battery/ignition contact 15 according to DIN 72552

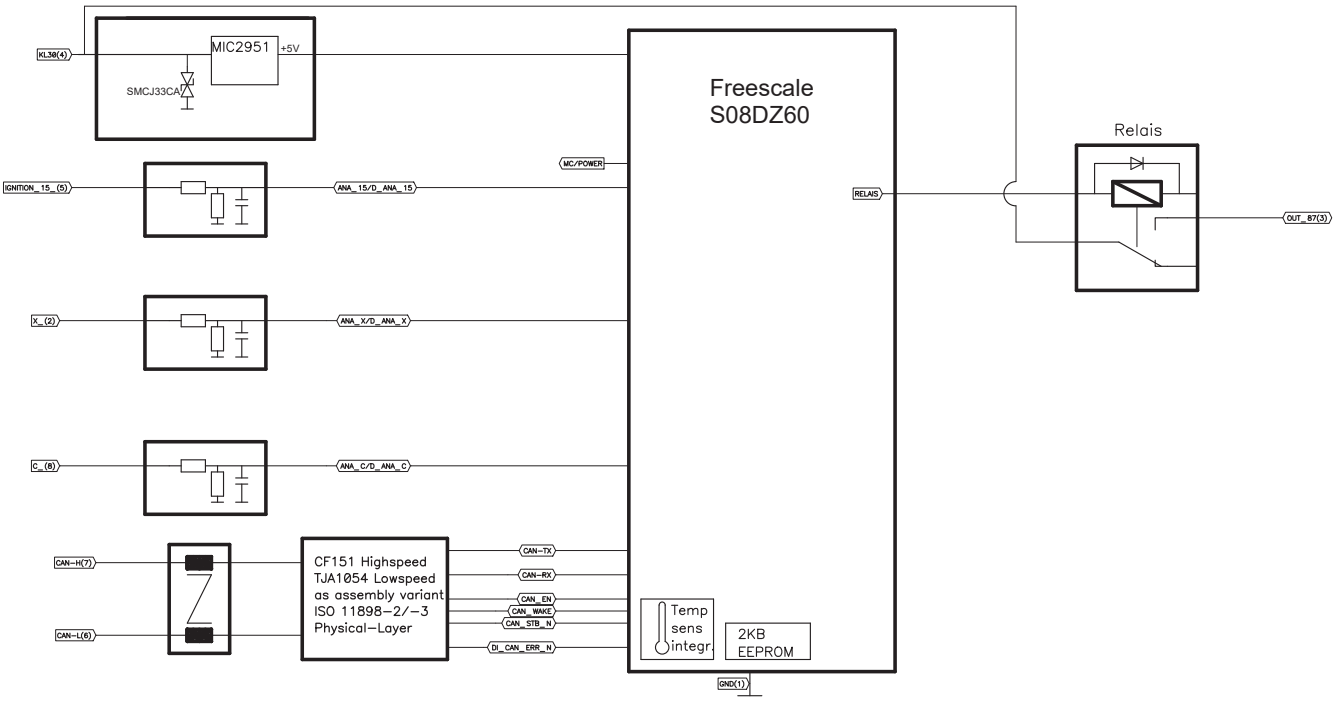
BLOCK DIAGRAM S42



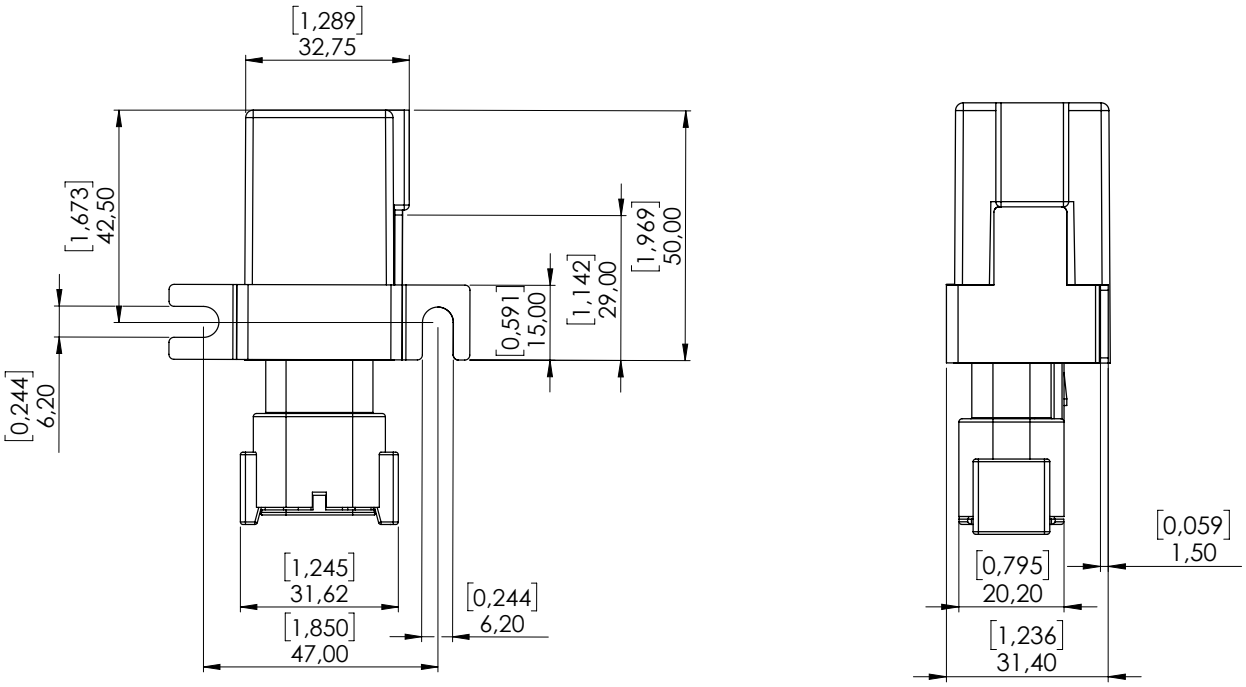
BLOCK DIAGRAM S43



BLOCK DIAGRAM S44



TECHNICAL DRAWING WITH CLAMPS IN MM [INCH]



front view

side view

ASSEMBLY OPTIONS AND ORDER INFORMATION WITH HIGH SIDE OUTPUT

Order number	Supply voltage	Current consumption at 12 V	Current consumption at 24 V	Pin enumberation of inputs		Pin enumberation of outputs		CAN Bus	Features
		in mA ± 2 mA	in mA ± 2 mA	A Voltage 0 – 11.4 V	B Digital input	C High side output	D PWM ≤ 500 Hz	High-Speed	
1.107.910.001	9-32 V / S42	23	24	5, 8	5, 8	2, 3	2, 3	X	

ASSEMBLY OPTIONS AND ORDER INFORMATION WITH RELAY OUTPUT

Order number	Supply voltage	Current consumption at 12 V	Pin enumberation of inputs			Pin enumberation of outputs	CAN Bus	Features
		in mA ± 2 mA	A Voltage 0 – 11.4 V	E Frequency Hz	B Digital input	F Relay outputs	High-Speed	
1.107.710.01	12 V / S43	27	5, 8	8	5, 8	2, 3	X	
1.107.710.0E	12 V / S44	27	2, 5, 8	2	2, 5, 8	3	X	

ACCESSORIES

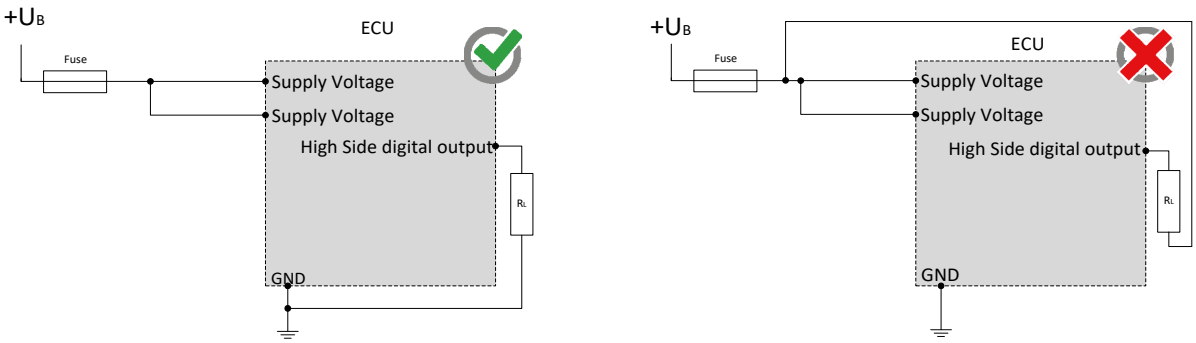
Description	Order number
Starter Kit µPLC CAN	1.100.110.22
Programming tool MRS Developer Studio	1.100.100.09
PCAN-USB interface	105358
Programming cable set	302379

MANUFACTURER

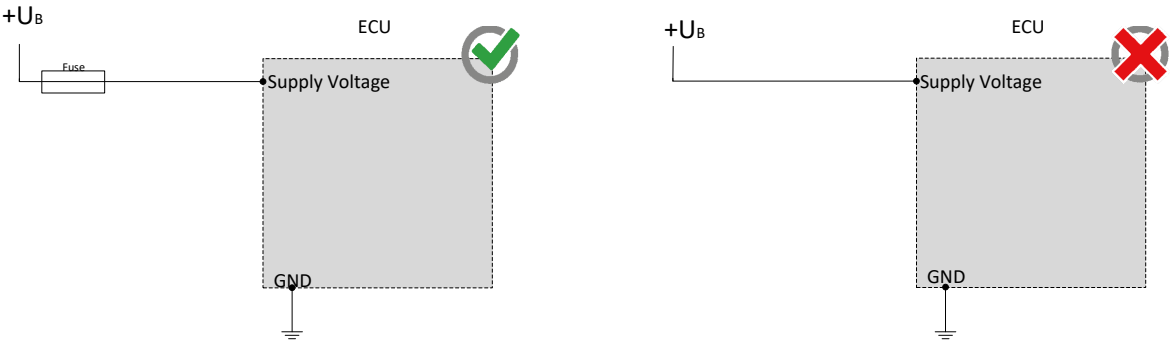
MRS Electronic GmbH & Co. KG
Klaus-Gutsch-Str. 7
78628 Rottweil
Germany

NOTES ON WIRING AND CABLE ROUTING

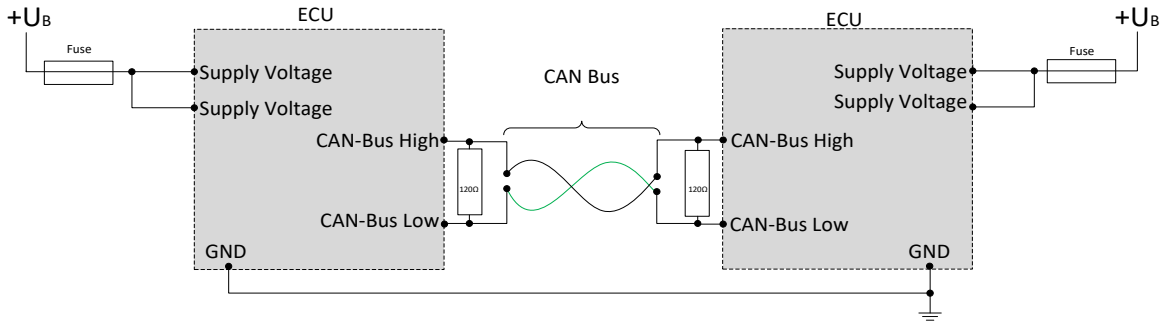
Higside outputs may only be connected to ground.



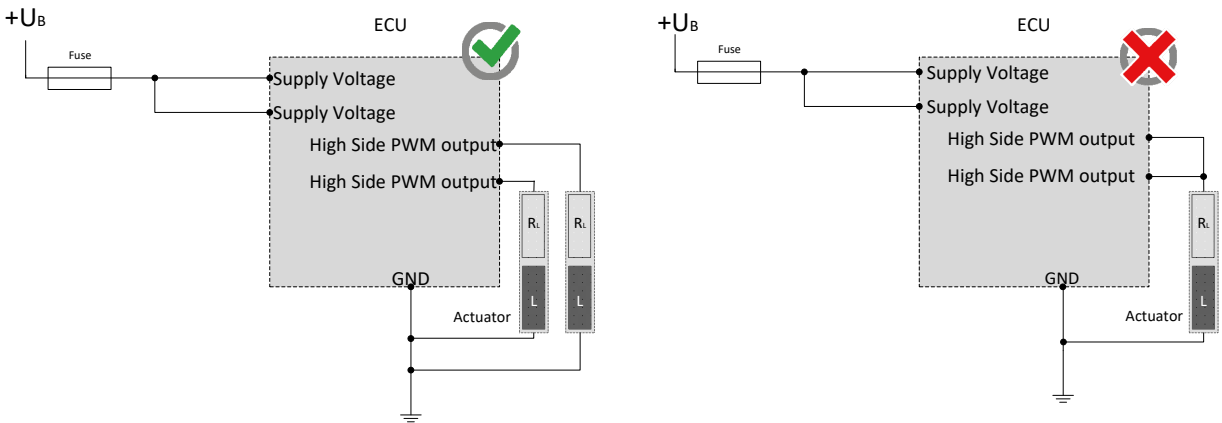
The control must be protected against overload (see performance data)



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.



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



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.

