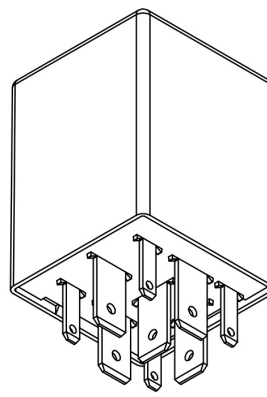# MRS ELECTRONIC

DATASHEET CAN 4 ANA 1.112

mounting direction

view of plug

DESCRIPTION

The Micro PLC CAN 4 ANA offers many possible applications with its 5 inputs and outputs. One analog input and four I/Os, the function of which can be individually defined. These inputs/outputs can be used as four analog outputs for current (0-24mA) and voltages (0-10V). Or you can configure them as four analog inputs.

TECHNICAL SPECIFICATION

Housing	PA66GF30 plastic
Connector	9-pin bottom panel
Weight	28 g
Temperature range (according to ISO 16750-4)	-40 °C to +85 °C
Environmental protection	IP 6K8, when watertight socket is used and the mounting direction is correct
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	**Configurable as:** Analog (0...11.4 V/0...33.7 V) Current input (0...24 mA) Frequency input
Outputs	**Configurable as:** Constant voltage source Analog voltage output
Operating voltage	9-32 V
Starting voltage	8 V
Overvoltage protection	≥ 33 V
Undervoltage cut-off	≤ 8 V
Quiescent current	20 µA (bei 12 V und 24 V)
Reverse polarity protection	Yes
CAN Interfaces	Highspeed 2.0 A/B according to ISO 11898-2

REGULATORY APPROVALS AND TESTING

E1 approval	ECE R10 05 7522
Electrical tests	Acc. to ISO 16750-2: Short Circuit supply I/O lines Reverse Polarity Interrupt Pin Break plug Jump Start Acc. to ISO 16750-4: Long-term overvoltage at 65 °c Storage Test Tmax and Tmin Operations Test Tmax and Tmin Acc. to ISO 7637: Car pulses 1 to 4 to ECE R10

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.

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INPUT FEATURES - SUMMARY

Pin 1, 3	Usable as analog or digital input Resolution Accuracy	12 Bit 1% full scale	Pin 5, 8	Usable 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 Conversion factor	500 Ω f_g=30 Hz ± 3 % 3 (33 Digits≈ 100 mV, S.5)	Voltage input 0…11.4 V (see "A")	Input resistance Input frequency Accuracy Conversion factor	500 Ω f_g=30 Hz ± 3 % 3 (33 Digits≈ 100 mV, S.5)
Voltage input 0...33.6 V (see "B")	Input resistance Input frequency Accuracy Conversion factor	500 Ω f_g=75 Hz ± 3 % 8,8 (12 Digits≈ 100 mV, S.5)	Voltage input 0...33.6 V (see "B")	Input resistance Input frequency Accuracy Conversion factor	500 Ω f_g=75 Hz ± 3 % 8,8 (12 Digits≈ 100 mV, S.5)
Digital input	Input resistance Turn-on threshold (11.4 V) Turn-off threshold (11.4 V) Turn-on threshold (33.6 V) Turn-off threshold (33.6 V)	500 Ω 7 V 5.5 V 20.5 V 15.6 V	Digital input	Input resistance Turn-on threshold (11.4 V) Turn-off threshold (11.4 V) Turn-on threshold (33.6 V) Turn-off threshold (33.6 V)	500 Ω 7 V 5.5 V 20.5 V 15.6 V
Current input 0...24 mA (see "C")	Input resistance Conversion factor	500 Ω ≈0,0175 (580 Digits≈ 10 mA, S.5)	Current input 0...24 mA (see "C")	Input resistance Conversion factor	500 Ω ≈0,0175 (580 Digits≈ 10 mA, S.5)
Frequency input (see "D")[2]	Input resistance Accuracy Turn-on threshold (11.4 V) Turn-off threshold (11.4 V) Turn-on threshold (33.6 V) Turn-off threshold (33.6 V)	500 Ω Up to 5 kHz max. ± 3 % 7 V 5.5 V 20.5 V 15.6 V			

[1] cutoff frequency (-3 dB)
[2] When programming via C-code, both frequency inputs can be read in parallel.

CONFIGURATION OF INPUTS

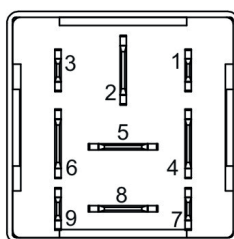| Desired Configuration	Setting via
Voltage input 0-11.4 V AI_NAME	DO_I_NAME = 1, DO_30V_10V_NAME = 0, PWM_20MA_NAME = 0
Voltage input 0-33.6 V AI_NAME	DO_I_NAME = 1, DO_30V_10V_NAME = 1, PWM_20MA_NAME = 0
Analog voltage output / current input	Set: DO_I_NAME = 1, PWM_20MA_NAME (0-100% = 0-UB$_{-3 V}$)
Current output	Set: DO_I_NAME = 0, PWM_20MA_NAME (0-100% = 0-22 mA)
Frequency input (X and C)	Reading of the input frequency via FREQ_NAME

OUTPUT FEATURES - SUMMARY

Pin 1,3,5,8

Digital, positive switching	Switching voltage Switching current Analog voltage output	UB_{-3V} 25 mA

PIN ASSIGNMENT POWER SUPPLY AND INTERFACES

Pin	Pin description	Pin	Pin description
2	Supply voltage	7	CAN - H
4	Battery/ignition contact 15	9	CAN - L
6	Ground		

PIN ASSIGNMENT INPUTS AND OUTPUTS

Pin	Programm signal	Pin description	Pin	Programm signal	Pin description
1	DI_X AI_X DO_30V_10V_X DO_I_X PWM_20MA_X FREQ_X	Digital input X Analog input X Range selection 11.4/33.6 V Current sink X Current output X Analog voltage output Frequency input X	5	DI_87A AI_87A DO_30V_10V_87A DO_I_87A PWM_20MA_87A	Digitale input 87A Analog input 87A Range selection 11.4/33.6 V Current sink 87A Current output 87A Analog voltage output
3	DI_C AI_C DO_30V_10V_C DO_I_C PWM_20MA_C FREQ_C	Digital input C Analog input C Range selection 11.4/33.6 V Current sink C Current output C Analog voltage output Frequency input C	8	DI_87 AI_87 DO_30V_10V_87 DO_I_87 PWM_20MA_87	Digital input 87 Analog input 87 Range selection 11.4/33.6 V Current sink 87 Current output 87 Analog voltage output

Bottom view

PIN FEATURE MAP

analog/digital inputs		
Pin	**signal**	**description**
1	DI_X AI_X DO_30V_10V_X DO_I_X PWM_20MA_X FREQ_X	Digitaleingang Analogeingang Bereichsumschaltung 11.4 V / 33.7 V Stromsenke X Strom-/Analogspannungsausgang Frequenz
3	DI_C AI_C DO_30V_10V_C DO_I_C PWM_20MA_C FREQ_C	Digitaleingang Analogeingang Bereichsumschaltung 11.4 V / 33.7 V Stromsenke C Strom-/Analogspannungsausgang Frequenz
5	DI_87A AI_87A DO_30V_10V_87A DO_I_87A PWM_20MA_87A	Digitaleingang 87A Analogeingang 87A Bereichsumschaltung 11.4 V / 33.6 V Stromsenke 87A Strom-/Analogspannungsausgang 87A
8	DI_87 AI_87 DO_30V_10V_87 DO_I_87 PWM_20MA_87	Digitaleingang 87 Analogeingang 87 Bereichsumschaltung 11.4 V / 33.6 V Stromsenke 87 Strom-/Analogspannungsausgang 87

CPU

Freescale S9S08DZ60
clock frequency:8 Mhz
Flash: 60 K
RAM: 4 K
EEPROM: 2 K

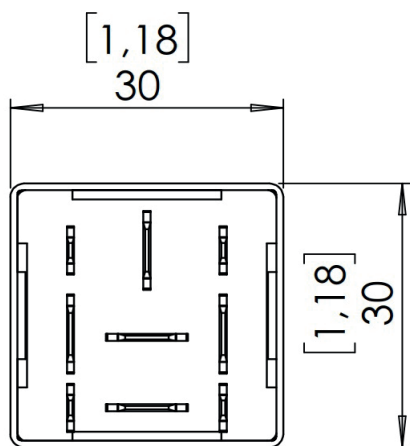| Interfaces		
Pin	**signal**	**description**
7	CAN-H	CAN-Bus High
9	CAN-L	CAN-Bus low

Power supply		
Pin	**signal**	**description**
2	KL30	Supply Voltage
4	KL15	Ignition
6	GND	Ground

BLOCK FUNCTION DIAGRAM
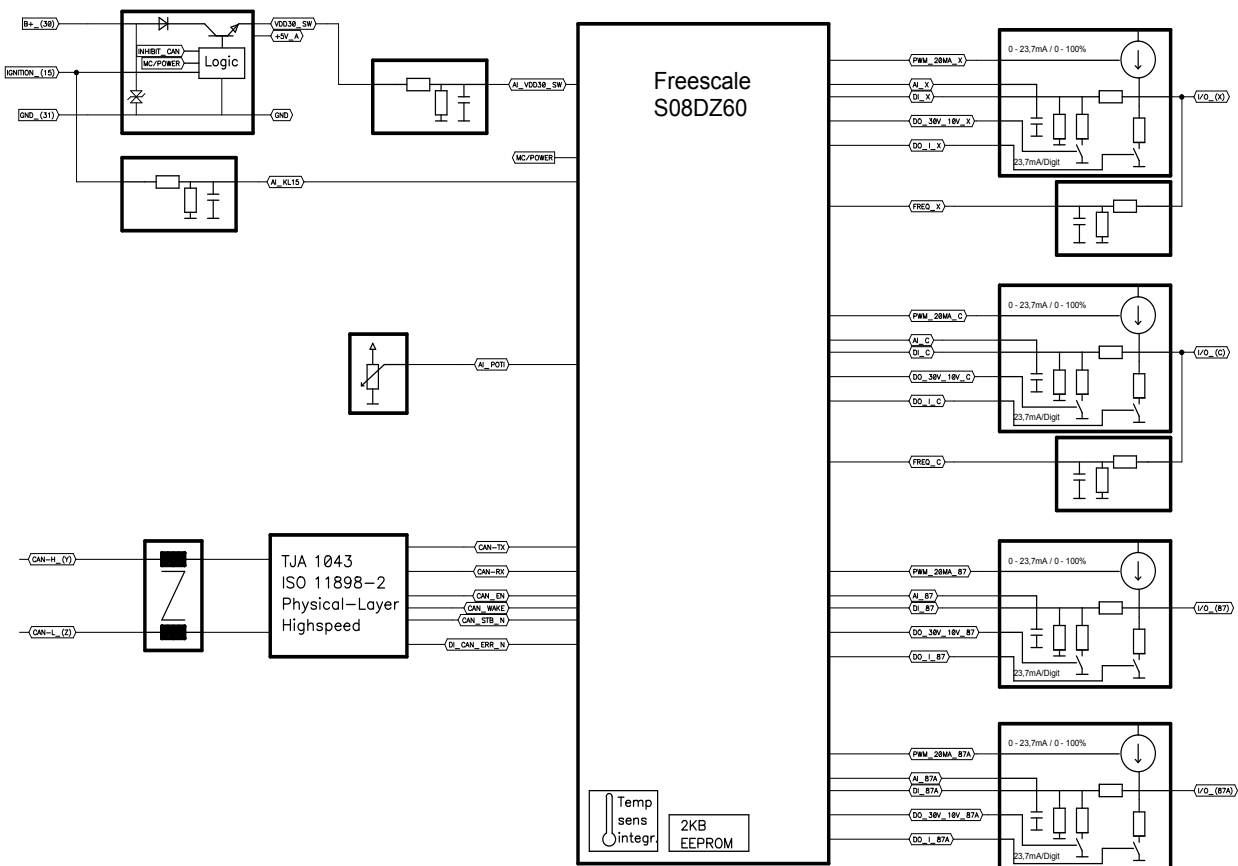
TECHNICAL DRAWING IN MM [INCH]

Bottom view
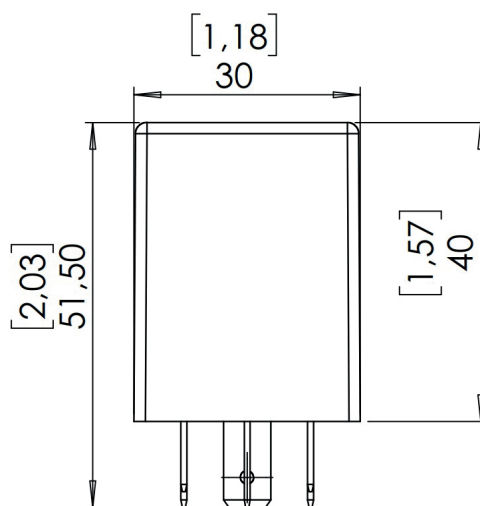
Side view

CONVERSION FACTOR

Conversion Factor Voltage (12 V Input)

Conversion Factor Voltage (30 V Input)

Conversion Factor Current (12 V Input)

Conversion Factor Current (30 V Input)
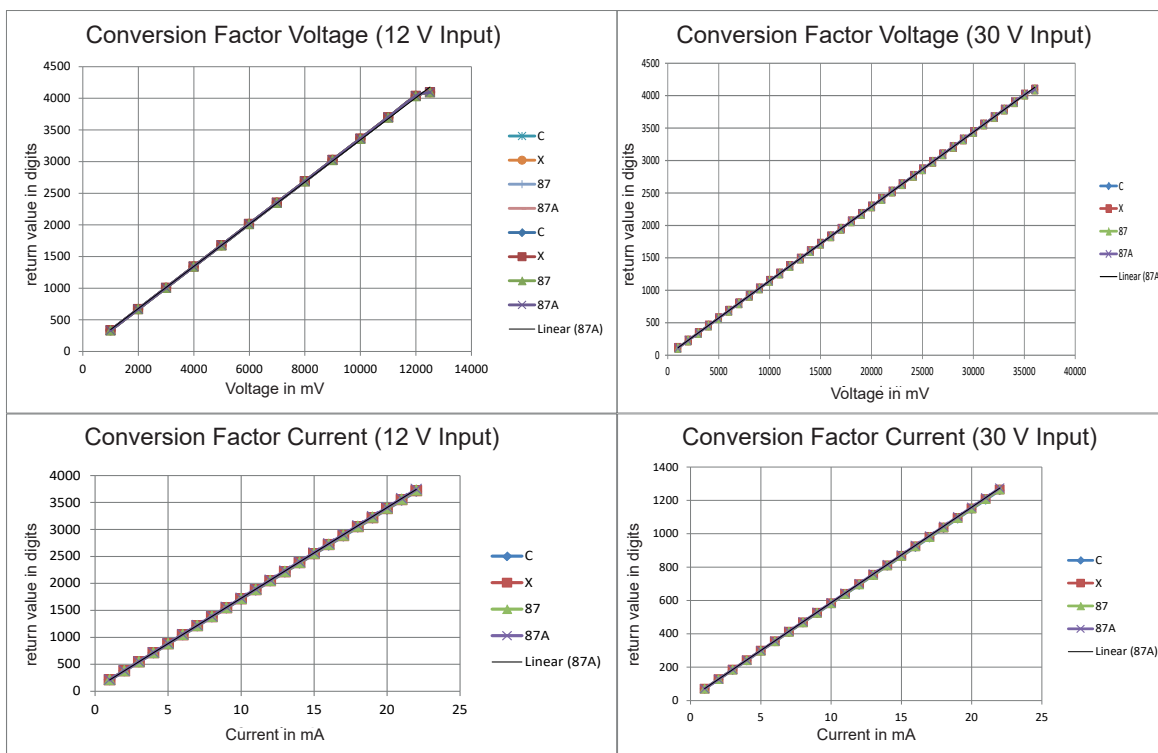
ASSEMBLY OPTIONS AND ORDER INFORMATION

Order number	Pin numbering of the inputs				CAN Bus		Remarks
	A Voltage 0 – 11.4 V	B Voltage 0 – 33.6 V	C Current 0 - 24 mA	D Frequency 0 - 5.5 kHz	High-Speed	Low-Speed	
1.112.300.00	1,3,5,8	1,3,5,8	1,3,5,8	1,3	X		
1.112P.300.00	1,3,5,8	1,3,5,8	1,3,5,8	1.3	X		CANopen

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ACCESSORIES

Description	Order number
Programming tool MRS Developers Studio	1.100.100.09
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	114265
FASTON terminal 6.3 mm 1.5-2.5 mm^2	103064
FASTON terminal 6.3 mm 1.0 mm^2	102355
FASTON terminal 2.8 mm 0.5-1.0 mm^2	105292
Housing bracket	1.017.08.00
PCAN-USB Interface	105358
Cabel FLRY 2 x 0.5 mm² white/green SL20	113085

MANUFACTURER

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

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.de

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

ℹ️ **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.

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.