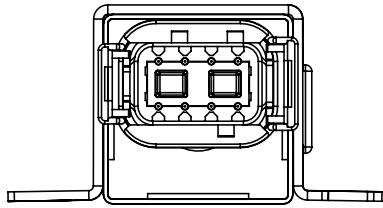


angled view



view of plug

## DESCRIPTION

The proportional valve control unit with CAN bus is used for flow rate control of a proportional valve. It is required for many hydraulic applications. CAN bus enables data exchange between modules and ensures easy integration into existing systems.

## TECHNICAL DATA

Housing	Plastic
Connector	DEUTSCH DTM04-08PA
Weight	75 g
Temperature range (ISO 16750-4 compliant)	-40 °C to + 85 °C
Environmental Protection	IP 6K8, with correct mounting direction (plug down)
Current consumption	30 mA
Over-current protection	1 A + load current
Total inputs and outputs	2 analog inputs, 1 PWM output
Inputs	Analog inputs 0... 11.4 V
Outputs	PWM output
Operating voltage	9 - 32 V (Code C for 12 V, Code E for 24 V)
Overvoltage protection	≥ 33 V
Reverse polarity protection	integrated
CAN interfaces	CAN Interface 2.0 A/B acc. to ISO 11898-2

## REGULATORY APPROVALS AND TESTING

E1 approval	05 7521
Elektrical tests	Acc. to ISO 16750: Short circuit protection Reverse polarity Interruption pin Interruption connector Long-term overvoltage at $T_{65^{\circ}\text{C}}$ Storage test at $T_{\text{max}}$ and $T_{\text{min}}$ Operation test at $T_{\text{max}}$ and $T_{\text{min}}$ Temperature steps Moist heat Superimposed AC voltage Reset behavior in case of voltage dip Acc. to ISO 10605:2008: ESD: ±8 kV Acc. to ISO 7637 - 2: Puls 1, 2a, 2b, 3a, 3b, 4 Acc. to ISO 10605: ESD up to ± 8 kV

## 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

For extended storage capacity from 32k you need the Codewarrior license. Download the paid license easily and securely from NXP.

## INPUT FEATURES - SUMMARY

Pin 5 (15)			Pin 8 (C)		
	Programmable as analog or digital input			Programmable 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 href="#">A</a> )	Input resistance	22.7 kΩ	Voltage input 0...11.4 V (see <a href="#">B</a> )	Input resistance	22.7 kΩ
	Input frequency	$f_g^1 = 60 \text{ Hz}$		Input frequency	$f_g^1 = 60 \text{ Hz}$
	Accuracy	$\pm 3 \%$		Accuracy	$\pm 3 \%$
Digital input positive (see <a href="#">A</a> )	Input resistance	22.7 kΩ	Digital input positive (see <a href="#">B</a> )	Input resistance	22.7 kΩ
	Input frequency	$f_g^1 = 60 \text{ Hz}$		Input frequency	$f_g^1 = 60 \text{ Hz}$
	Turn-on threshold	6.5 V		Turn-on threshold	6.5 V
	Turn-off threshold	4.8 V		Turn-off threshold	4.8 V

<sup>1</sup> Cutoff frequency (-3 dB)

## OUTPUT FEATURES - SUMMARY

Pin 3 (87)			Pin 8 (C) as open collector output		
	Protective circuit for inductive loads	Free-wheeling diode integrated		max. power (at $T_{\text{Room}}$ )	2 W
	Wire fault diagnostics	Possible via current sense			
	Short circuit diagnostics	Possible via current sense			
PWM output (see <a href="#">C</a> )	Output frequency	100 Hz- 5 kHz			
	max. switching current at +85 °C <sup>2</sup>	2.4 A			
	at +23 °C <sup>2</sup>	3.8 A			
	Connection valve:	Pin 8 against Pin 5 (GND)			

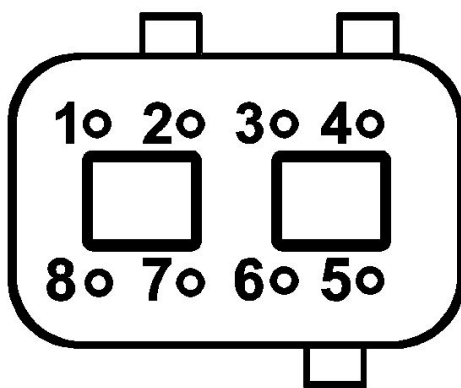
<sup>2</sup> measured with Duty Cycle = 100 %, UB= 28 V, with inductive load

PIN ASSIGNMENT POWER SUPPLY AND INTERFACES

Pin	Description	Pin	Description
1	Ground	6	CAN low
4	Operation voltage	7	CAN high

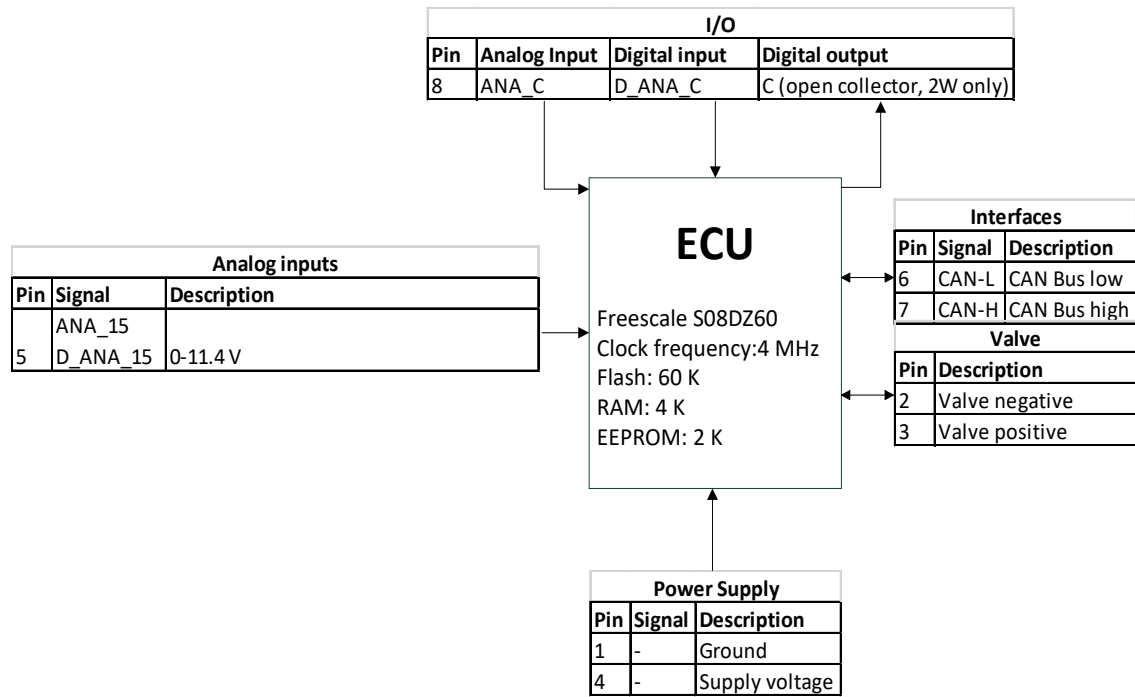
PIN ASSIGNMENT INPUTS AND OUTPUTS

Pin	Signal	Description	Pin	Signal	Description
2	-	Connection proportional valve negative (B)	5	ANA_15 D_ANA_15	Analog input 15 0-11.4 V or digital input 15
3	ANA_PWM	Connection proportional valve positive (A)	8	ANA_C D_ANA_C C	Analog input C 0-11.4 V or digital input C or digital output (open collector, 2 W max.)

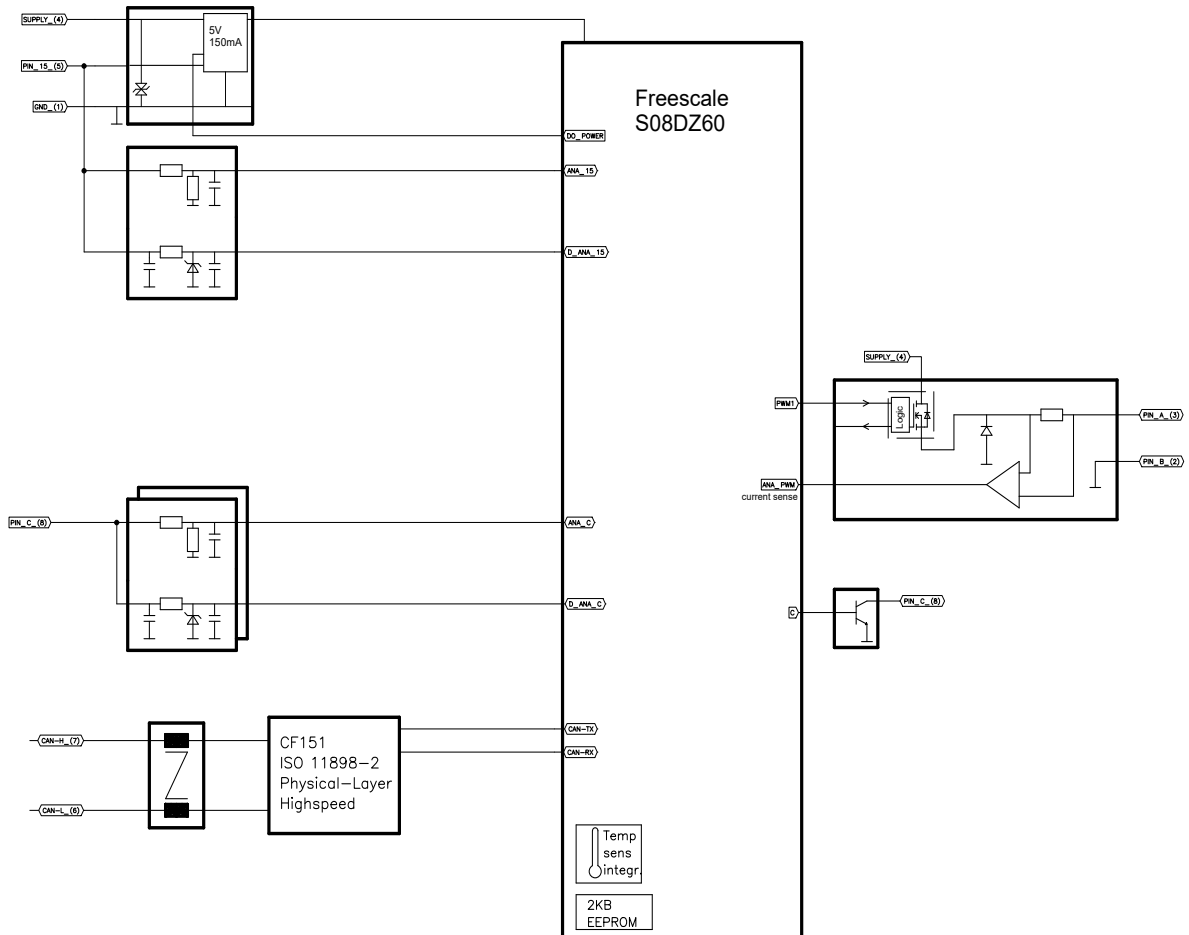


view of plug - from below

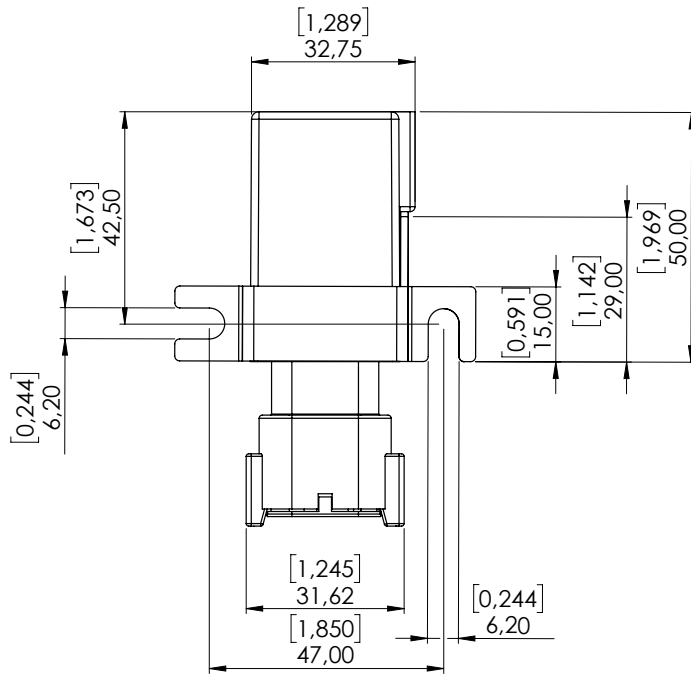
PIN FEATURE MAP



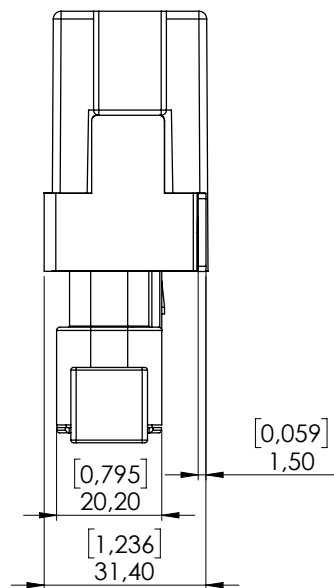
BLOCK FUNCTION DIAGRAM



TECHNICAL DRAWING WITH CLAMPING BRACKET IN MM [INCH]



front view



side view

## ASSEMBLY OPTIONS AND ORDER INFORMATION

	Inputs		Outputs		CAN bus	Remarks
	A Voltage 0 – 11.4 V	B I/O's (can be used as analog input or digital output)	C PWM (100 Hz - 5 kHz)	High-speed		
<b>1.108.910.00</b>	5	8	3 → 2	X	The output of the valve (pin 8 and 5) may only operate with connected load between pin 8 and 5. The length between ECU and valve may not exceed 2 m. If this length must be exceeded for application, an individual acceptance must take place.	

## ACCESSORIES

Description	Order number
Programming tool MRS Developers Studio	1.100.100.09
PCAN-USB Interface	105358

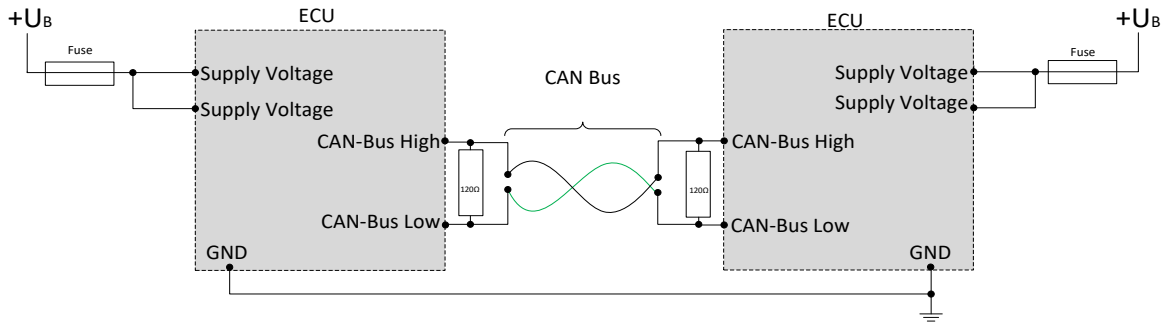


## MANUFACTURER

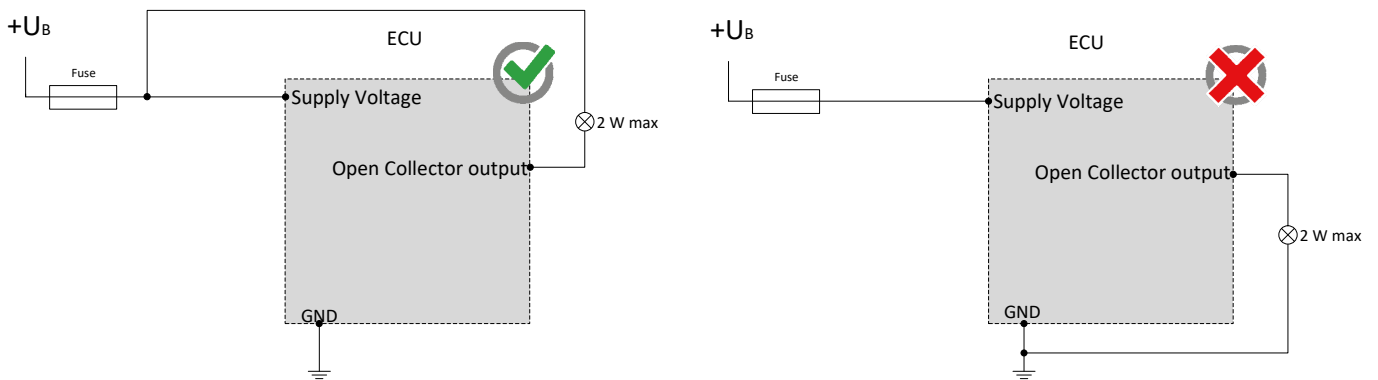
MRS Electronic GmbH & Co. KG  
Klaus-Gutsch-Str. 7  
78628 Rottweil  
Germany

NOTES ON WIRING AND CABLE ROUTING

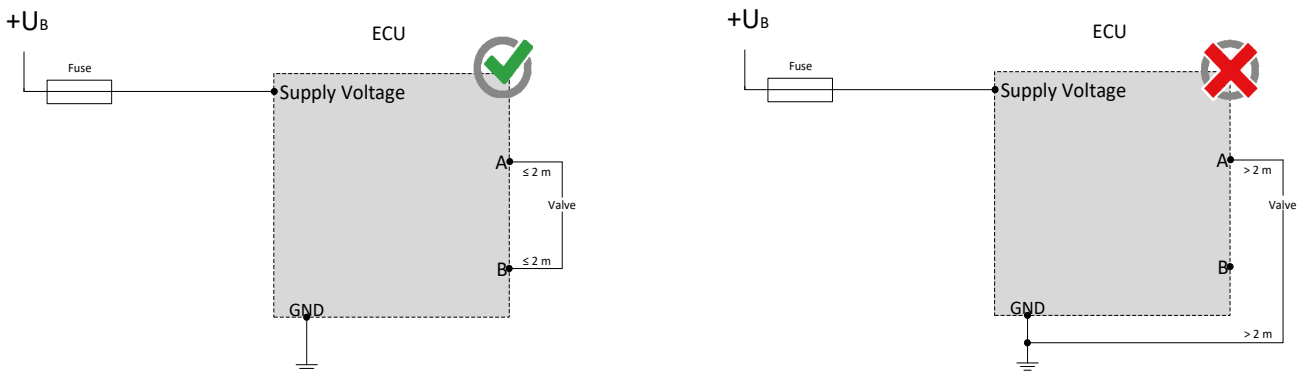
CAN bus communication is the main communication between the control unit and the vehicle. Therefore, connect the CAN bus with special care and check the correct communication with the vehicle to avoid undesired behavior.



The open-collector output may only be switched to power supply of the module.



The output of the valve (pin 8 and 5) may only operate with connected load between pin 8 and 5. The length between ECU and valve may not exceed 2 m. If this length must be exceeded for application, an individual acceptance must take place.





## 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.