DATASHEET MICROPLEX 7X 1.132







view of plug

DESCRIPTION

Get to know the smartest and smallest CAN Power Distribution Module (PDM) system that fits into any fuse box in ISO 280 format: the patented MicroPlex 7X is the smallest CAN controller with the highest integration density.

TECHNICAL DATA

REGULATORY APPROVALS AND TESTING

| Housing | PA66GF30 | E1 Label | 05 8491 | | |
|---|--|--|---|--|--|
| Connector | 2.8 mm tab | Electrical tests | Acc. to ISO 16750: Short circuit protection Reverse polarity | | |
| Weight | 50 g | | | | |
| Temperature range (ISO 16750-4 compliant) | - 40 °C bis +85 °C | | Storage test Tmax and Tmin Operational test Tmax and Tmin | | |
| Environmental protection | IP 67 in combination with fuse box | | Acc. to ISO 7637 - 2:2004: Pulse 1, 2a, 2b, 3a, 3b, 4 | | |
| Current consumption | 36 mA at 12 V and 24 V | | FSD up to + 8 kV acc. to ISO 10605.2008 | | |
| Over-current protection | 10 A | | | | |
| Total inputs and outputs | 7 (3 input, 4 I/O's) | | | | |
| Inputs | Configurable as: Analog (0-11.4 V, switchable to 0-32 V) Frequency input (AI_1) Current input (0-25 mA_AI_1 | SOFTWARE/PROGRAMMING | | | |
| | | Programming System | | | |
| AI_2) 1kΩ Pull-Up against U _{Bat} | | MRS Developers Studio MRS Developers Studio | | | |
| Outputs | Configurable as: Digital output PWM output | MRS Developers St programming with F integrated into "C-co | Studio with built-in functions library, similar FUP. Custom software blocks can be code". Program memory is sufficient for about nponents. | | |
| Operating voltage | 9-32 V | 300 basic logic com | | | |
| Starting voltage | ≥ 6 V | | | | |
| Overvoltage protection | ≥ 33 V | | | | |
| Undervoltage cut-off | ≤ 6 V | | | | |
| Quiescent current | 160 μA at 12 V; 220 μA at 24 V | | | | |
| Reverse polarity protection | Yes | | | | |
| CAN Interfaces | CAN interface 2.0 A/B, ISO 11898-2 compliant | | | | |



INPUT FEATURES - SUMMARY

| Pin 2 | Programmable as analog oder digital input Resolution Accuracy | 12 Bit ± 2 % full scale | Pin 8 | Programmable as analog oder digital input Resolution Accuracy | 12 Bit ± 2 % full scale |
|--|---|--|--|---|--|
| Voltage input 011.4 V (see <u>A</u>) | Input resistance Input frequency Accuracy Factor | 44.3 kΩ f _g = 20 Hz¹ ± 3 % 1 digit ≈ 2.96 mV | Voltage input 011.4 V (see <u>A</u>) | Input resistance Input frequency Accuracy Factor | 79.3 kΩ f _g = 20 Hz¹ ± 3 % 1 digit ≈ 2.96 mV |
| Voltage input 032 V (see <u>B</u>) | Input resistance Input frequency Accuracy Factor | 30 kΩ f _g = 60 Hz¹ ± 3 % 1 digit ≈ 8.7 mV | Voltage input 032 V (see <u>B</u>) | Input resistance Input frequency Accuracy Factor | 54.5 kΩ f _g = 60 Hz¹ ± 3 % 1 digit ≈ 8.7 mV |
| Frequency input (see <u>C</u>) | Input resistance Input frequency | 44.3 kΩ ± 3 % tolerance | Current input 025 mA (see <u>D</u>) | Input resistance Factor | 500 Ω 168 digits ≈ 1 mA |
| | Turn-on threshold Turn-off threshold | up to ≤ 3.5 kHz 5.8 V 4.2 V | Pin 9, 10, 11, 12 | Programmable as analog oder digital | |
| Current input 025 mA (see <u>D</u>) | Input resistance Factor | 500 Ω 168 digits ≈ 1 mA | | input Resolution Accuracy | 12 Bit ± 2 % full scale |
| Pin 7 | Programmable as analog oder digital input Perclution | 12 Bit | Analog input Positive (see <u>E</u>) | Input resistance Input frequency Accuracy | 30 kΩ f _g = 44 Hz ¹ ± 3 % |
| | Accuracy | ± 2 % full scale | | | |
| Voltage input 011.4 V (see <u>A</u>) | Input resistance Input frequency Accuracy Factor | 79.3 kΩ f _g = 20 Hz¹ ± 3 % 1 digit ≈ 2.96 mV | | | |
| Voltage input 032 V (see <u>B</u>) | Input resistance Input frequency Accuracy Factor | 54.5 kΩ f _g = 58 Hz¹ ± 3 % 1 digit ≈ 8.7 mV | | | |
| Sensor input (see <u>E</u>) | Pull-up resistance | 1 kΩ against supply | | | |

¹ cutoff frequency (-3 dB)

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OUTPUT FEATURES - SUMMARY

| Pin 9,10, 11, 12 | Protective circuit for inductive loads | Via freewheeling diode | | |
|--|--|-----------------------------------|--|--|
| | Wire fault diagnostics | Possible via current sense | | |
| | Short circuit diagnostics | Possible via current sense | | |
| Digital, positive switching (high side; see "F") | Switching voltage Switching current Conversion factor Current sense | Up to max. 32 V 2 A tbd | | |
| PWM-output (see "F") | Output frequency Switching current @ 200 Hz Switching current @ 500 Hz | Up to max. 500 Hz 1.3 A 1 A | | |
| Short circuit resistance against GND and VS | Switching-off is controlled by high side driver for each output channel | | | |
| Protective circuit Overload | Overtemperature shutdown integrated | | | |

PERFORMANCE TESTS AT MAX

| Test without PWM | Tested Channel | Load | Duration | Test mit PWM | Tested Channel | PWM / DC | Load | Duration |
|------------------------|----------------|--------------------------------|------------|-----------------|----------------|--------------------|--|-----------|
| 1 | All channels | 2 A for each output (∑ 8 A) | Permanent | 1 | All channels | 200 Hz 50 % | 1.3 A for each | Permanent |
| 2 | All channels | 3 x 2 A and 1 x 3 A(Σ 9 A) | 30 Minuten | | | | output (∑ 5.2 A) | |
| | | | | 2 | All channels | 500 Hz 50 % | 1.1 A for each output (∑ 4.4 A) | Permanent |
| | | | | 3 | All channels | 1000 Hz 50 % | 0.8 A for each output (∑ 3.2 A) | Permanent |



PIN ASSIGNMENT POWER SUPPLY AND INTERFACES

| Pin | Description | Pin | Description |
|-----|-------------------|-----|--------------------------------|
| 1 | Ground | 6 | Battery/ignition contact KL 15 |
| 3 | Operating voltage | | |

PIN ASSIGNMENT INPUTS AND OUTPUTS

| Pin | Signal | Description | Pin | Signal | Description |
|-----------|---|---|----------------------------|--|---|
| 2 | 2 AI_1 DO_30V_10V_1 | Analog input 1 0-11.4 V or switching to analog input 1 0-32 V or Frequency input or | 9 | AI_OUTPUT_4 DO_OUTPUT_4 PWM_OUTPUT_4 AI_CS_4 | Analog input OUTPUT_4 or Digital output OUTPUT_4 with PWM possibilty and Current sense |
| DO_20MA_1 | switching to current input | 10 | AI_OUTPUT_3 DO_OUTPUT_3 | Analog input OUTPUT_3 or Digital output OUTPUT 3 with | |
| 7 | 7 AI_3 DO_30V_10V_3 | Analog input 3 0-11.4 V or _3 switching to analog input 3 0-32 V or connectable 1 kΩ Pull-up against supply | | PWM_OUTPUT_3 AI_CS_3 | PWM possibilty and Current sense |
| | AI_3_PU | | 11 | AI_OUTPUT_2 DO_OUTPUT_2 PWM_OUTPUT_2 | Analog input OUTPUT_2 or Digital output OUTPUT_2 with PWM possibilty and |
| 8 | 8 AI_2 | Analog input 2 0-11.4 V or | | AI_CS_2 | Current sense |
| | DO_30V_10V_2 switching to analog input 2 0-32 V or DO_20MA_2 switching to current input | | 12 | AI_OUTPUT_1 DO_OUTPUT_1 PWM_OUTPUT_1 AI_CS_1 | Analog input OUTPUT_1 or Digital output OUTPUT_1 with PWM possibilty and Current sense |



Pin assignment - bottom view

When connecting the module, it is important to pay attention to the correct terminal assignment and direction (see notch) of the module. Improper connection (such as twisting or shifting) can cause unexpected behavior and / or dangerous situations!



PIN - FEATURE MAP



BLOCK FUNCTION DIAGRAM



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TECHNICAL DRAWING IN MM





ASSEMBLY OPTIONS AND ORDER INFORMATION

| | Inputs | | | | | Outputs | CAN bus |
|--------------|--------------|--------------|--------------|----------------------|--------------------|--|------------|
| | A Voltage | B Voltage | C Current | D Frequency Hz | E Sensor inputs | F I/O´s (optionally as analog or digital input | High-speed |
| | 0 – 11.4 V | 0 – 32 V | 0 - 25 mA | | 1 kΩ pull-up | or digital output or) ≤ 500 Hz | |
| 1.132.300.00 | 2 7 8 | 2 7 8 | 2 8 | 2 | 7 | 9 10 11 12 | 4 5 |



ACCESSORIES

| Description | Order number |
|--|--------------|
| Programming tool MRS Developers Studio | 1.100.100.09 |
| MicroPlex socket (Fuseholder) | 301302 |
| Wiring harness for MicroPlex with Fuseholder | 301301 |
| Connector package MicroPlex | 301288 |
| PCAN-USB Interface | 105358 |



MANUFACTURER

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DATASHEET MICROPLEX 7X 1.132



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.





NOTES ON WIRING AND CABLE ROUTING

Higside outputs may only be switched to ground.



The sensor supplies can be "lifted" through an external circuitry, for example the creation of higher voltage, as they only work as a voltage source but not as voltage drain. The lift of a voltage source may lead to unforeseen malfunctions and damages of the control unit in case of permanent operation. $> V_{\text{Ref}}$



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.