

KLARI-MOD MC3



Features

- 1- to 6-channel measuring module with 3 galvanically isolated ASICs and 1 shared microcontroller.
- 2 Lemo-sockets for various PROBES (current, voltage, temperature).
- 1 MS3-socket for measuring 3 voltages and 1 temperature.
- Option: the measurement results can be displayed on the module screen.
- the measurement results can also transmitted "online" via 2 CANs.
- adjustable switchovers between slow and fast measure mode.
- 1 USB-interface enables the configuration of the measuring module.
- perfect adaption to the measuring task, using pluggable measuring adapters ("PROBES"). A huge number of available PROBES enable also the measurement of quiescent- and operating currents, e.g. 200 $\mu\Omega$ -PROBE, measuring range of 1,25 mA...+3.600/-1.500 A.
- as a result of the low power consumption (approx. 40...80 mA, depending on the configuration) the module is applicable for long-term recordings. To limit the data volume, various procedures are configurable via software.
- **Individual configuration of the measurement channels:**
 - via CAN1-interface with max. 8.000 frames/second, 125 μ s/measuring value
 - Option: to the configurable display
- **PROBE variants:**
 - current- ,voltage- or temperature - PROBE (PT-1000)
 - MS3-plug with U_batt, U_aux, U_3 and temperature-PROBE (PT1000)

Version

- Bopla-Gehäuse ca. 135/110/35 mm (L/B/H)
- **measuring module with / without display available**
- protection class IP65
- temperature range -20...+70°C with display
- temperature range -40...+85°C without display
- supply 6..50 V DC, current consumption approx. 40...80 mA (at 12 V supply)
standard: Sub-D, 15-pin plug. Alternatively via MS3-plug (U_batt/U_aux)

A detailed technical description is contained in our user manual

Delivery

- measuring module with MS3-plug and measuring signal cable (please order PROBES separately)
- PC software for configuration via CAN or USB-2.0 interface
- CAN database and documentation on CD ROM
- USB 2.0 connection cable

Accessories

- cable harness IP65 with supply and CAN



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TECHNICAL DATA

Input	<ul style="list-style-type: none"> 1...6 measuring channels with 3 ASICs 2 x Lemo-socket for various PROBES (voltage, current or temperature) 1 x MS3-socket for U_batt, U_aux, U_3 and temperature (PT1000) 																		
Resolution	<ul style="list-style-type: none"> 5 measuring ranges with selectable autorange-function for PROBE-connections ± 15 bit/measuring range <table border="1"> <thead> <tr> <th>Gain</th> <th>Range Lemo</th> <th>Resolution</th> </tr> </thead> <tbody> <tr> <td>100</td> <td>+/- 7,5 mV</td> <td>0,250 µV/bit</td> </tr> <tr> <td>50</td> <td>+/- 15 mV</td> <td>0,500 µV/bit</td> </tr> <tr> <td>24</td> <td>+/- 30 mV</td> <td>1 µV/bit</td> </tr> <tr> <td>6</td> <td>+/- 120 mV</td> <td>4 µV/bit</td> </tr> <tr> <td>1</td> <td>+ 720 / - 300 mV</td> <td>24 µV/bit</td> </tr> </tbody> </table>	Gain	Range Lemo	Resolution	100	+/- 7,5 mV	0,250 µV/bit	50	+/- 15 mV	0,500 µV/bit	24	+/- 30 mV	1 µV/bit	6	+/- 120 mV	4 µV/bit	1	+ 720 / - 300 mV	24 µV/bit
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Accuracy	<ul style="list-style-type: none"> ± 1% of measuring value ± 3 bit of range valid for temperature range of - 40 .. + 85°C 																		
Sample rate	<ul style="list-style-type: none"> single channel mode: max. 8.000 frames/s 2 x CAN = 2 x 8.000 frames/s 																		
Features	<ul style="list-style-type: none"> selectable data output channel (CAN 2.0B and/or USB-2.0 interface) data output configurable via CANs (Baudrate, Identifier etc.) internal CAN-termination, detachable via software automatic PROBE-identification with calibration value processing 																		
Output	<ul style="list-style-type: none"> 2 x CAN 2.0 A/B, (High-Speed CAN, ISO 11898) from 125 kbit/s up to max. 1 Mbit/s USB-2.0 interface 																		
Timestamp	<ul style="list-style-type: none"> 30 µs resolution (included in CAN frame) 																		
Housing	<ul style="list-style-type: none"> Bopla housing IP65 460 g 135/110/35 (l/w/h) 																		
Supply	<ul style="list-style-type: none"> 6,0...50 V DC 																		
Current consumption	<ul style="list-style-type: none"> approx. 40...80 mA at 12 V DC 																		
Configuration	<ul style="list-style-type: none"> via PC using CAN1 or USB-2.0 interface. Configurations could be created, archived and loaded into the module speed 2 x CAN: 125 kbit/s...1 Mbit/s measurement type, measuring speed, channels 																		
Modes	<ul style="list-style-type: none"> autorange function for all channels across all measuring ranges selectable sample speed for the channels 																		
Temperature range	<ul style="list-style-type: none"> - 40...+ 85°C for the module without display - 20 ...+ 70°C with display - 40...+ 130°C for the shunts 																		
Isolation	<ul style="list-style-type: none"> 80 V DC permanent isolation input <> output 																		

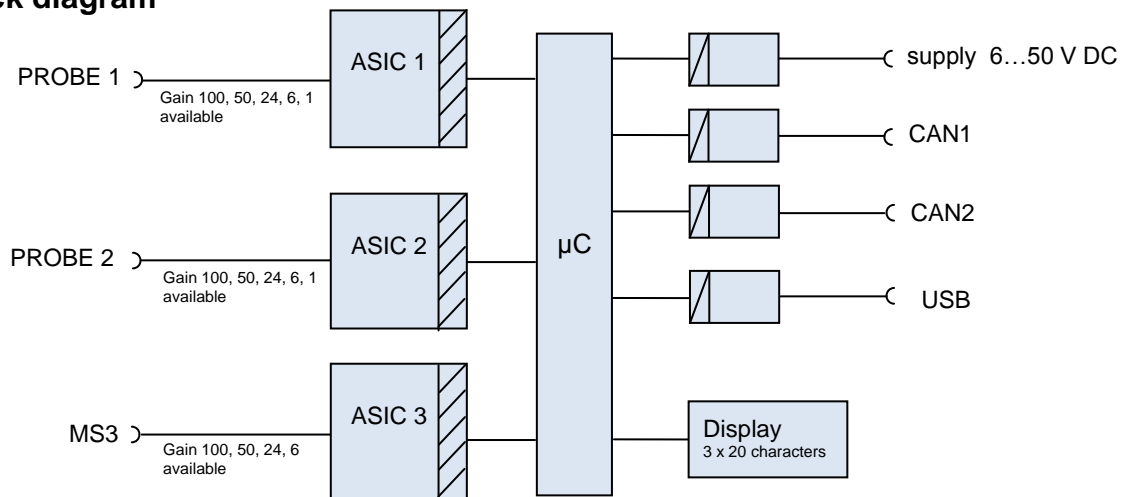
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Measuring ranges and resolutions for I- and U-PROBES (examples)

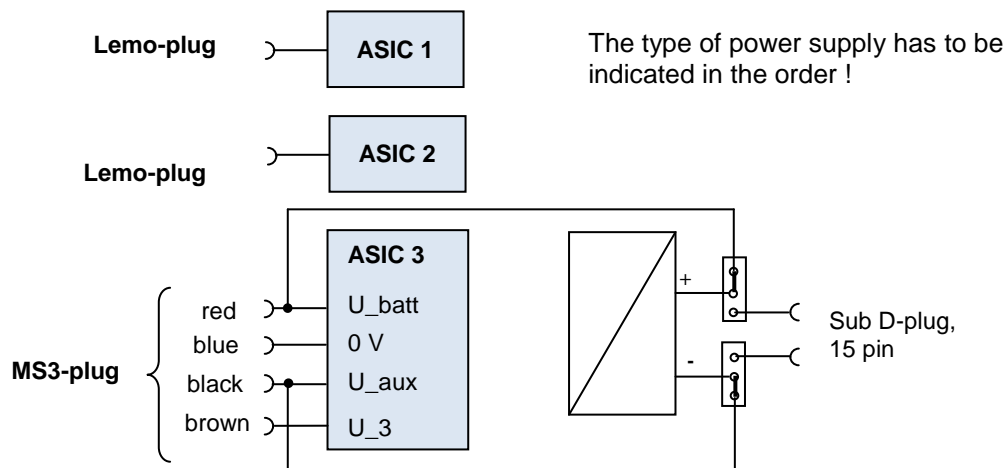
Gain	I-PROBE				U-PROBE	
	1 mΩ		200μΩ		80 V	
	Range [A]	Resolution [mA/Bit]	Range [A]	Resolution [mA/Bit]	Range [V DC]	Resolution [mV/Bit]
100	+/- 7,5	0,25	+/- 37,5	1,25	0...+/- 5	0,170
50	+/- 15	0,5	+/- 75	2,5	0...+/- 10	0,340
24	+/- 30	1	+/- 150	5	0...+/- 20	0,680
6	+/- 120	4	+/- 600	20	0...+/- 80	2,720
1	- 300/+ 720	24	- 1.500/+3.600	120		

Block diagram

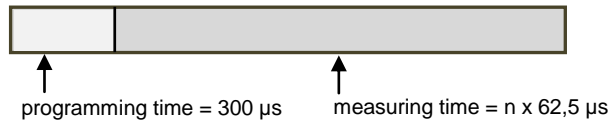


Module power supplied via MS3-plug:

The module has 2 switches inside, that allow the user to supply the module with power either via the 15-pin Sub D-plug or via the MS3-plug (U_batt and U_aux).

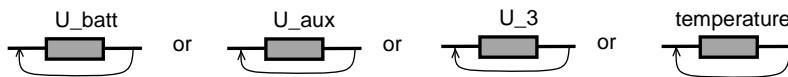


Principle of measurement

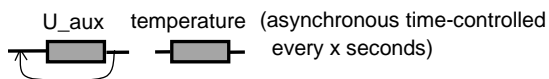
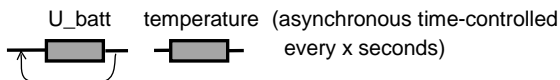


• Measurement options using MS3-plug: MS 3

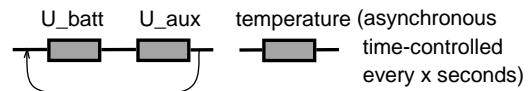
- Measuring 1 parameter



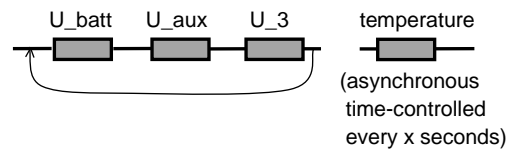
- Measuring 2 parameters



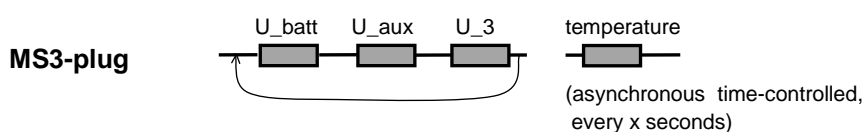
- Measuring 3 parameters



- Measuring 4 parameters



• Measurement options using 2 x Lemo and MS3 plug:



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Application

Power supply of the module via MS3-plug: red (+) and black (-) leads have to be connected.
Or via **Sub-D plug 15-pin** with cable harness.

Measurement of voltages U_{batt} and U_{aux} using 1 battery:
0 V-reference, blue lead has to be connected to minus pole of battery.
 U_{batt} = + signal_1, red lead to plus pole of battery.
 U_{aux} = + signal_2, black lead at a different measuring point.

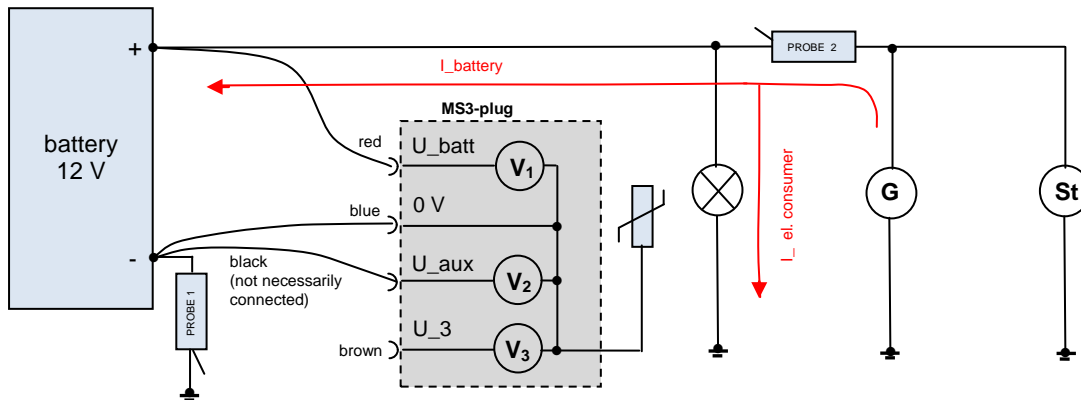
- **Module power supplied via Sub D-15 pin**

Measurement of currents and voltages using 1 battery:

- drive mode, motor is running, generator feeds battery and electrical consumers

$$I_{gen./starter} = I_{battery} + I_{el.consumer}$$

PROBE 1	$I_{battery}$
PROBE 2	$I_{generator/starter}$
MS3	$U_{battery}$



- **Module power supplied via MS3-plug**

Measurement of currents and voltages using 2 batteries: starting process

$$I_{battery} = I_{gen./starter} + I_{el.consumer}$$

PROBE 1	$I_{battery}$
PROBE 2	$I_{generator/starter}$
MS3	$U_{battery 1} + U_{battery 2}$

