Multifunctional Measuring Device with Display
Series MAP4000

Special Features

- processor controlled measuring device with digital display
- 24 bit Sigma-Delta converter for high accuracy and stability
- good cost/value ratio
- multifunctional: inputs for
  - potentiometer
  - DC voltage
  - current / voltage
  - resistance
  - temperature sensors
- adjustable supply voltage output (5...24 V/max. 1.2 W)
- input easily selectable by programming
- display projection -99 999...999 999
- accuracy 0.1 % +1Digit of full scale
- Tc 100 ppm/°K
- up tp 40 measurements/s
- 2 different supply ranges: 10...30 V or 80...250 V DC or AC
- measured unit can be shown in display

Options

- up to 4 programmable limit switches via relays
- analog output interfaces RS 232 or RS 485
- built in measuring data memory, readable using interface

The micro processor controlled process meters of the MAP4000 series show a high accuracy at a very good cost/value ratio. They enable the direct adaption of potentiometric sensors as well as of sensors with normalized analog output signals.

Due to the programming capability, the desired input variable can be flexibly adjusted.

Precision and safety

The high accuracy of up to 0.1% is achieved by using selected components, as for example the 24 bit Sigma-Delta converter.

2 programming levels are available: One code protected configuration menu and a user menu with the option to apply restrictions there to exclude end user errors. The programming is stored in a non volatile EEPROM memory.

Designed for your needs

Even the standard version offers a depth of functions (projection, digital filters, mathematic functions etc.). With optional extensions (limit switches, analog output, interfaces etc.), this functionality may be considerably expanded.

Adjustable supply voltage

This supply is adequate for connected Sensors. It is adjustable by means of a trimming potentiometer between 5...24V, the output power is max. 1.2 W.

Operation

The instrument is operated using 5 buttons on the front panel or via serial interface.
### Functional description

#### Standard functions:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaption input to output</td>
<td>Input unit and measuring range (coarse)</td>
</tr>
<tr>
<td>Measuring range</td>
<td>Fixed or with automatic measuring range change-over</td>
</tr>
<tr>
<td>Adaption</td>
<td>In configuration menu optional adaption of measured signals to display content, for example 0.1...4.9V -&gt; 0..250 (mm)</td>
</tr>
<tr>
<td>Display projection</td>
<td>-99 999...999 999</td>
</tr>
<tr>
<td>Digital Filters</td>
<td>Exponential Average Value Across 2...100 measurements</td>
</tr>
<tr>
<td>Rounding</td>
<td>Adjustment of increment of display</td>
</tr>
<tr>
<td>Mathematic functions</td>
<td>Min/Max value Storage of Min/Max value during the measurement</td>
</tr>
<tr>
<td>Tare function</td>
<td>Zerosing of an arbitrary displayed value</td>
</tr>
<tr>
<td>Peak value</td>
<td>Display shows either Max/Min value or actual measured value</td>
</tr>
<tr>
<td>Math. Operations</td>
<td>Polynomial, 1/x, Logarithm, exponential, Exponent, Square root, sin x</td>
</tr>
<tr>
<td>Operation Options (using front panel buttons)</td>
<td>Lock Blocking of buttons</td>
</tr>
<tr>
<td>Hold</td>
<td>Blocking of measurement</td>
</tr>
<tr>
<td>Tare function</td>
<td>Initiate tare</td>
</tr>
<tr>
<td>Reset</td>
<td>Reset of stored peak value</td>
</tr>
</tbody>
</table>

#### Optional Functions

**Comparators**

A value may be assigned to each comparator. The user may choose between various limit functions: Limit/ Dosing/ From-To. The limit values have both an adjustable hysteresis und and activation delay. The exceeding of a limit value is displayed on a LED on the front panel of the device and is put out by a relay.

**Analog Output**

This option may be used in Applications where a secondary computing unit (PLC) uses the information of the same sensor than this device. The output can transmit either a voltage or a current signal (selectable via menu).

**Data Logger (only available/useable with interface)**

The built in measurement data storage executes a measurement and storage of data in a time triggered mode after start of measurement. So the device works as a data logger.

2 Modes are available:
- FAST: for a fast measurement and storage of 80 measurements per second. The memory depth is up to 8 000 Values.
- RTC: the data storage is being triggered by the internal (Real Time) clock. The memory depth is up to 250 000 Values. The stored data can be read out via serial interface RS232 or RS485.

**Interface RS 232 or RS 485**

This Interface is suited to transmit measured data to a remote unit and to use those directly in the customers system. We offer both isolated RS232 and RS485.
### Technical data

#### Accuracy of the device
- **Accuracy**: ±0.1% of range + 1 digit
  - Temperature coefficient: ±0.15% of range + 1 digit (RTD, T/C)
- **Temperature coefficient**: 100ppm/°K
- **Measurement rate**: 0.1 ... 40 measurements/s
- **Overload capacity**: 10x (max. 30ms); bei >400V, 5A: 2x
- **Input filtering**: Exponential average, rounding
- **Functions**: Offset, min/max. value, tare, peak value, mathematical functions
- **External control during measurement**: HOLD, LOCK, Store
- **Memory depth RTC mode**: up to 250k entries (Format: time/date/measured value)
- **Memory depth FAST mode**: up to 8 k entries (Format: only measured value)
- **Watchdog**: Reset of the device after 1.2 s
- **Input ranges**:
  - **Voltage**: 0...60 / 150 / 300 mV DC
  - **Process dimensions Current**: 0..5mA or 0/4..20mA PM
  - **Voltage**: ±2V, ±5V, ±10V / 0...40V
  - **Resistance**: 0...100 / 1k / 10k / 100 kΩ or 5...10^5 Ω OHM
  - **Platin temperature sensor**: Pt 100 / Pt 500 / Pt 1 000 RTD
  - **Nickel temperature sensor**: Ni 1 000 / Ni10 000 Ni
  - **Thermo element**: J/K/T/E/B/S/R/N T/C
  - **Potentiometer**: Min. 500 Ω track resistance DU
- **Adaptation input to output**:
  - **Display projection**: -99 999...999 999, red LED display, display height 14mm
  - **Unit display**: The last two symbols on display may be used for description of measured units (adjustable in menu)
  - **Decimal point**: Adjustable in menu
  - **Display brightness**: Adjustable in menu
- **Supply voltage ranges**:
  - **Type 1**: 10...30V AC/DC ±10%, 10VA (MAP 4000 ...)
  - **Type 2**: 80...250V AC/DC ±10%, 10VA (MAP 4010 ...)
  - **The voltage supply is internally fused.**

#### Comparators (optional)
- **Type**: Digital, adjustable in menu, switching delay max. 30 ms
- **Range for comparator values**: -99 999...999 999
- **Hysteresis**: 0...999 999
- **Programmable delay**: 0.99s
- **Output**: Relays 1 and 2 with ON function (250VAC/30VDC, 3A)
  - Relays 3 and 4 with SWITCH function (250VAC/30VDC, 3A)

#### Analog output (optional)
- **Type**: Isolated, programmable with a resolution of max. 10 000 increments. Analog output corresponds with the displayed data
- **Selection signal type**: In configuration menu
  - **Nonlinearity**: 0.2% of range
  - **Temperature coefficient**: 100ppm/°K
  - **Dynamics**: Time delay max. 40 ms to input dimension
  - **Range Voltage**: ±0.2 / 5 / 10V
  - **Current**: 0..5mA oder 0/4..20mA*
  - ***: Load resistor < 500 Ω

#### Serial interface (optional)
- **Data format**: 8 bit / no parity / 1 stop bit
- **speed**: 600 ... 115 200 Baud
- **RS232**: Isolated
- **RS485**: Isolert, adressable (to max. 31 devices)

#### Data storage (only with serial interface)
- **RTC**
  - **Trigger**: using internal clock (real time)
  - **Speed**: selectable
  - **Max. memory depth**: 250 000 entries
- **FAST**
  - **Trigger**: internal (no real time)
  - **Speed**: 80 measurements/s
  - **Max. memory depth**: 8 000 entries

#### Adjustable excitation voltage
- **Adjustment range**: 5...24V DC
- **Max. output power**: 1.2 W
- **Adjustment process**: Trimming potentiometer at the back side of device

#### Environmental conditions
- **Stabilisation time**: To max. 15 minutes after switch on
- **Working temperature**: 0°C...60°C
- **Storage temperature**: -10°C...85°C
- **Protection class**: IP65 (front panel only, properly built in)
- **Electrical safety**: EN 61 010-1, A2
- **Insulations resistance**: Für Verschmutzungsgrad II, Messung CAT III
  - AC supply >600V (25°, 500V DC)*
  - DC supply (Input, output):
    - > 300V (25, 250V DC)
    - *2B: Primary isolation, DI: double isolation

#### BMC Compatibility
- **EN61 000-3-2 +A12**
- **EN61 000-4-2, -3, -4, -5, -8, -11**
- **EN 550 222, A1, A2**
### Ordering specifications

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAP 4 0 1 0 0 0 1 0 1</td>
<td>Series</td>
<td>M A P 4 0 1 0 0 0 1 0 1</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>00: 10...30 V AC/DC</td>
<td>10: 80...250 V AC</td>
</tr>
<tr>
<td>Analog output</td>
<td>0: no analog output</td>
<td>1: analog output present</td>
</tr>
<tr>
<td>Interface</td>
<td>0: no interface</td>
<td>1: RS 232</td>
</tr>
<tr>
<td>Number comparator relays</td>
<td>0: none</td>
<td>2: 2 relays (2 x ON)</td>
</tr>
<tr>
<td>Display colour</td>
<td>1: red</td>
<td></td>
</tr>
<tr>
<td>Data storage (only with interface)</td>
<td>0: no storage</td>
<td>1: RTC storage</td>
</tr>
<tr>
<td>Adjustable Excitation voltage (5...24 V/Max. 1.2 W)</td>
<td>0: excitation present</td>
<td>1: excitation present</td>
</tr>
</tbody>
</table>

### Connections

[Diagram of connections]