**Application**

The 520AID01 module records up to 6 analog measured values.

The module 520AID01 is able to process the following types of signals:
- Analog measured values (AMI)
- Measured floating point information (MFI)

Following measurement ranges can be configured for 520AID01 R0001:
- ± 2.5 mA
- ± 5 mA
- ± 10 mA
- ± 20 mA

Following measurement ranges can be configured for 520AID01 R0002:
- ± 1 V DC
- ± 10 V DC

Other effective ranges and live zero signals become generated out of these ranges through conversion of the communication unit (CMU).

The module is available in two versions (rubrics):
- R0001: Current measurement version
- R0002: Voltage measurement version

**Characteristics**

**Analog inputs**

Basic signal checks and cyclic processing functions are already done locally in order to unburden the communication unit. The module transmits relevant changes as event via the RTU I/O bus.

The 6 differential inputs are not galvanic isolated against the power supply.

Single-ended or differential input values are resolved by up to 2048 steps (11 bit plus sign) for 100 % measurement amplitude.

The differential inputs are protected against static and dynamic over-voltages by a protection circuit. A low-pass filter suppresses unwanted frequency components.

The internal high resolution of the AD converter allows to scan all measuring ranges with the same resolution. 2 additional measurement channels are used for automatic zero calibration. This compensates the longterm drift of the components.
For elimination of tolerances a calibration is done during production.

Measuring range and line frequency are easily to configure by the RTUtil500 configuration tool. The synchronization of the scan cycle with the line frequency is used to increase the line frequency interference suppression of the DC input signal.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Conversion time per channel</th>
<th>Scan cycle time (same for all channels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 Hz</td>
<td>50 ms</td>
<td>400 ms</td>
</tr>
<tr>
<td>50 Hz</td>
<td>60 ms</td>
<td>480 ms</td>
</tr>
<tr>
<td>16.7 Hz</td>
<td>200 ms</td>
<td>1600 ms</td>
</tr>
</tbody>
</table>

Power supply input

The required power for the module is supplied via the RTU520 I/O bus connector.

I/O controller (IOC)

The micro-controller on the module processes all time critical tasks of the parameterized processing functions. Moreover it carries out the interactive communication with the RTU I/O bus. All configuration data and processing parameters are loaded by the communication unit via the RTU I/O bus.

In connection with an I/O adapter (e. g. 520ADD01) or the RTU520 communication unit the module is interfaced to the RTU520 I/O bus.

The analog input unit can execute the following processing functions on the measured values:
- Scan cycle and line frequency interference suppression
- Zero value supervision and switching detection
- Smoothing
- Threshold value monitoring on absolute value or with accumulation
- Periodic transmission and background cycles

During initialization and operation the module carries out a number of tests. If a fault occurs it is reported to the communication unit. All fault conditions impairing the function of the module are displayed as common fault signal by a red LED. A failure of the module is detected by the communication unit.
## Technical data

In addition to the RTU500 series general technical data, the following applies:

### Input channels 520AID01

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs</td>
<td>6 differential inputs</td>
</tr>
</tbody>
</table>
| Configurable measuring range | R0001:  
  - ± 2.5 mA  
  - ± 5 mA  
  - ± 10 mA  
  - ± 20 mA  
  R0002:  
  - ± 1 V DC  
  - ± 10 V DC |
| Input impedance | 50 Ω (R0001)  
  82 kΩ (R0002) |
| Max. load | 50 mA for 1 min |
| Resolution | 11 bit + sign  
  10 bit + sign ±2.5 mA |
| AD converter resolution | 13 bit |
| Accuracy at 25 °C | < 0.25 %  
  < 0.5 % @ ±2.5, ±5, ±10 mA and ±1 V DC  
  < 1% @ ±10 V DC |
| Linearity error at 25 °C | < 0.15 % (positive range)  
  < 0.25% (negative range) |
| Temperature drift (0... 70 °C) | < 150 ppm/K |
| Max. common mode input voltage | ±150 V DC (electrical limit)  
  ±10 V DC (functional limit) |
| Max. differential input voltage | 1 V DC (current inputs)  
  10 V DC (voltage inputs) |
| Common mode rejection | > 85 dB @ 25 °C |
| Configurable line frequency $f_N$ | - 16.7 Hz  
  - 50 Hz  
  - 60 Hz |
| Line frequency interference suppression | > 75 dB @ $f_N$ ±5 % |

### Current consumption for power supplied via WRB bus

<table>
<thead>
<tr>
<th>Voltage (V DC)</th>
<th>Current (mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>18</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

### Signaling by LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERR (red)</td>
<td>Common fault information for the module</td>
</tr>
</tbody>
</table>

## Mechanical layout

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>35 mm x 95 mm x 117 mm (Width x Height x Depth)</td>
</tr>
<tr>
<td>Housing type</td>
<td>Plastic housing (V-0), IP20, RAL 7035 light gray</td>
</tr>
</tbody>
</table>
| Mounting | DIN rail mounting  
  EN 50022 TS35: 35 mm x 15 mm or 35 mm x 7.5 mm |
| Weight | 0.14 kg |

### Connection type

<table>
<thead>
<tr>
<th>Type</th>
<th>Specifications</th>
</tr>
</thead>
</table>
| Process connector | 1 x 13 pole 5.08 mm pluggable screw terminals (included in delivery)  
  0.2... 2.5 mm² / AWG 24 - AWG 12 |

### Insulation tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Specifications</th>
</tr>
</thead>
</table>
| AC test voltage | 2.5 kV, 50 Hz  
  IEC 61000-4-16  
  IEC 60870-2-1 (class VW3) |
| Impulse voltage withstand test | 5 kV (1.2 / 50 µs)  
  IEC 60255-5  
  IEC 60870-2-1 (class VW3) |
| Insulation resistance | > 100 MΩ at 500 V DC  
  IEC 60255-5 |

### Immunity test

<table>
<thead>
<tr>
<th>Test</th>
<th>Specifications</th>
</tr>
</thead>
</table>
| Electrostatic discharge | 8 kV air (level 3) / 4 kV contact (level 2)  
  IEC 61000-4-2  
  Performance criteria A |
| Radiated Radio-Frequency Electromagnetic Field | 10 V/m (level 3)  
  IEC 61000-4-3  
  Performance criteria A |
| Electrical Fast Transient / Burst | 4 kV (level X)  
  IEC 61000-4-4  
  Performance criteria A |
| Surge | 2 kV (level 3)  
  IEC 61000-4-5  
  Performance criteria A |
| Conducted Disturbances, induced by Radio-Frequency Fields | 10 V (level 3)  
  IEC 61000-4-6  
  Performance criteria A |
| Damped oscillatory wave | 2.5 / 1 kV (level 3)  
  IEC 61000-4-18  
  Performance criteria A |

### Environmental conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specifications</th>
</tr>
</thead>
</table>
| Nominal operating temperature range: Start up: | -25...+70 °C  
  -40 °C |
| Max. operating temperature, max. 99h: | +85 °C  
  EN 60068-2-1, -2-2, -2-14 |
### Environmental conditions

<table>
<thead>
<tr>
<th>Relative humidity</th>
<th>5 ... 95 % (non condensing)</th>
</tr>
</thead>
</table>

### Ordering information

<table>
<thead>
<tr>
<th>520AID01 R0001</th>
<th>1KGT033100R0001</th>
</tr>
</thead>
<tbody>
<tr>
<td>520AID01 R0002</td>
<td>1KGT033100R0002</td>
</tr>
</tbody>
</table>
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