1. Description
The fully calibrated advanced sensor module IMC-A-R0001 has been designed for all applications in which high currents, voltages and temperatures have to be measured. It contains a precision resistor with 100 μΩm, the ISA-ASIC and all analogue circuits for a complete 4-channel 16bit data acquisition system. The internal μC is supplying the clock and controls the measurements and communication with the ISA-ASIC. The module contains a RS232 interface which allows a simple integration into an external system.

2. Measurement functions
Current – by using the voltage drop over the shunt
Voltage – by using an internal voltage divider

3. Electrical characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>3.3 V</td>
<td>5.2 V</td>
</tr>
<tr>
<td>Supply current</td>
<td>15 mA</td>
<td>25 mA</td>
</tr>
</tbody>
</table>

**Current measurement**
- resistance value of the shunt: 100 μΩm
- nominal current range: ±300 A
- sampling rate (Dual mode): 900 S/sec
- error: ±(0.05% + 20 mA)
- resolution: 10 mA
- temperature coefficient: 75 ppm/K
- max. current: 1500 A for 1 sec.

**Voltage measurement**
- voltage range: ±30 V
- error: ±(0.05 % + 15 mV)
- resolution: 1 mV
- max. input-voltage: 80 V
- temperature coefficient: 50 ppm/K

**Interface: RS232**
- baud rate: 250000 bits/sec, parity: none
- data bits: 8, stop bits: 1
- data format: ASCII
- number format: decimal

**Notes:**
1) maximum absolute current range: ±390 A
2) at room temperature and external averaging over 100 values, at 900 S/sec the noise contribution is 100 mA resp 75 mV
3) measuring resolution
4) without TC calibration
5) for max. load capacity of shunt

4. Start-up and operation of the module
After the connection of the module acc. to the following table the module automatically starts to send the following string via the RS232:

'firmware version=1.02'&CR&LF&'IHMMAM1500 serial number = xxxxxxx'

After this message the IMC-A-R0001 continually transmits the measurement results:

Current value in mA&Tab&voltage value in mV&CR&LF&
Current value in mA&Tab&voltage value in mV&CR&LF& …

Remark: It is very important that the buffer of the serial interface is big enough to store the data for the selected time frame.

5. Pin configuration (left to right)

<table>
<thead>
<tr>
<th>PIN number</th>
<th>function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>unused</td>
</tr>
<tr>
<td>2</td>
<td>unused</td>
</tr>
<tr>
<td>3</td>
<td>V&lt;sub&gt;x&lt;/sub&gt;</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>VCC&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>6</td>
<td>TxD&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>7</td>
<td>RxD&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>8</td>
<td>NC</td>
</tr>
<tr>
<td>9</td>
<td>unused</td>
</tr>
<tr>
<td>10</td>
<td>unused</td>
</tr>
<tr>
<td>11</td>
<td>unused</td>
</tr>
<tr>
<td>12</td>
<td>unused</td>
</tr>
<tr>
<td>13</td>
<td>unused</td>
</tr>
<tr>
<td>14</td>
<td>RESET</td>
</tr>
</tbody>
</table>

**Notes:**
1) input for the unknown voltage V<sub>x</sub> with reference to GND
2) supply voltage input +3.3 V or +5 VDC
3) RS232, +3.3 V or +5 V level (depending on power supply voltage)
4) output / 5) input

All pins which are unused should be connected to GND.

6. Additional information
For special applications other resistance value resp. other current and voltage ranges as well as temperature and differential voltage measurement in the mV-range can be offered. For these applications special firmware versions are available to allow very flexible parameter settings for sampling rate, gain and the selection of the measurement functions.
photo of the IMC-A-R0001

**IMC-A-R0001**

typical error as function of measurement current

![Graph showing typical error as function of measurement current](image)

- **error**: ±(0.05% + 20 mA)
- **typical calibration error**
- **pos limit**
- **neg limit**

**typical measurement error at room temperature**

![Shunt drawing](image)

**shunt drawing**

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**IMC-A-R0001**

ISABELLENHÜTTE Heusler GmbH & Co. KG

Dillenburg, 15.12.2008, jh/he/bs

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**ISAscale**

ADVANCED SENSOR MODULE

with IHM-A-1500

preliminary data sheet, version 2.3