

## Sensor modules AS01 - AS06

Preliminary datasheet

May 9, 2013

### 1 Features

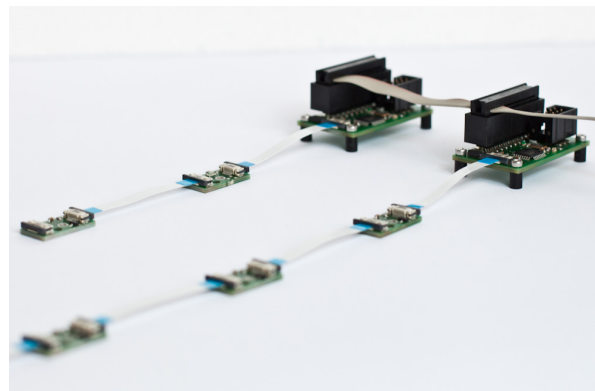
- max. 6 sensor-daisy-chain capability
- For Modularis Connector AS
- Temperature (AS01T)
- Brightness (AS01L)
- Color (AS02)
- Microphone (AS03)
- Hall-Effect Position Sensor (AS04)
- Button (AS05)
- Solder2ADC Adapter (AS06)

### 2 Brief Description

"AS" stands for "Analog Sensor". Using zero insertion force (ZIF) connectors with a 0.5 mm pitch, a cute package with a maximum of flexibility for application purposes is achieved. Every module incorporates one sensor with analog output. Due to the special signal routing from connector "Out" to Connector "IN" daisy-chaining of the modules is possible. Therefore multidimensional or locally distributed measurement setups can easily be connected.



1: A member of the family: brightness sensor AS01L



2: Two dimensional temperature and brightness measurement setup using AS01T and AS01L

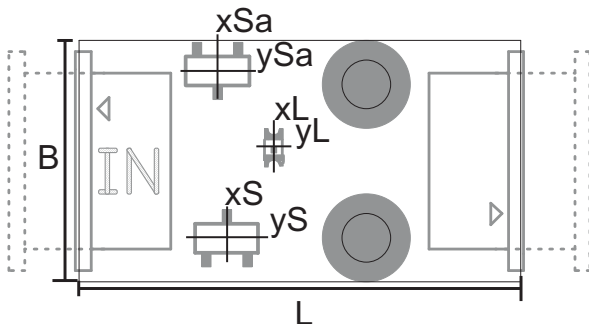
## 3 Mechanical Dimensions and Definitions

Symbol	Unit	Value	Description
B	mm	11 <sup>1</sup>	Width of module's PCB
L	mm	20	Length of module's PCB
C	mm	13	Left distance pcb-edge to mounting hole center points
D	mm	7	Distance between center points of Mounting-Holes
E	mm	2	Distance center point of Mounting-Hole to long-side edges
R	mm	1.1	Radius of the mounting holes, suitable for M2 screws
xS	mm	t.b.d.m.s. <sup>2</sup>	Standard x-coordinate <sup>3</sup> of sensorelement
yS	mm	t.b.d.m.s.	Standard y-coordinate of sensor element
xSa	mm	t.b.d.m.s.	Alternate x-coordinate of sensor element
ySa	mm	t.b.d.m.s.	Alternate y-coordinate of sensor element
xL	mm	t.b.d.m.s.	x-coordinate of LED
yL	mm	t.b.d.m.s.	y-coordinate of LED

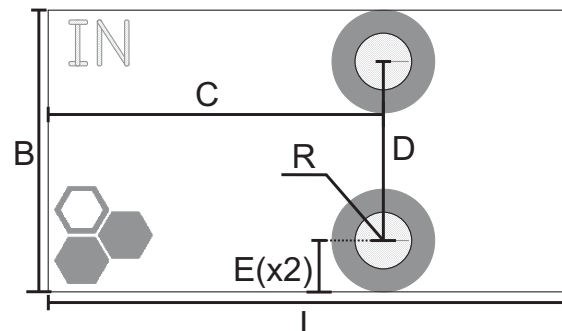
<sup>1</sup>dimensions can vary by  $\pm 0.2$  mm, if not otherwise specified.

<sup>2</sup>t.b.d.m.s. = to be defined model specific

<sup>3</sup>origin of coordinate system is placed in the lower left corner.



3: Topside



4: Position of Holes

## 4 Daisy-Chain

### 4.1 Pinning

The AS Connector is an 8 pole ZIF-Connector with 0.5 mm pitch. "IN" Connector's pinout is given by

1. GND
2. ADC 7
3. ADC 6
4. ADC 3
5. ADC 2
6. ADC 1
7. ADC 0
8.  $V+ = +5\text{ V}$  nominal

Pin numbers increase from top to bottom in figure 3. The "Out" Connector is mirrored, i.e. You'll find GND on Pin "8".

### 4.2 How long may the Daisy-Chain become?

The connector AS incorporates 6 analog channels - therefore a maximum of six analog sensor modules can be directly daisy-chained, if every sensor module needs only one analog channel.

### 4.3 What is NAC?

The number of needed analog channels (NAC) is a sensor module specific value. The sum over the daisy-chained modules' NACs may not exceed six, the maximum of available analog channels.

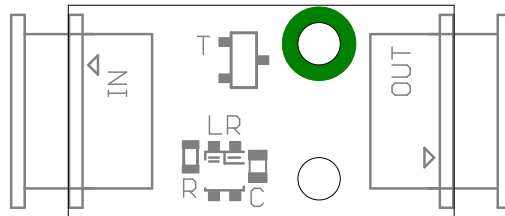
### 4.4 Plug and Measure

Every Modularis controller module with AS connector is delivered with I2C-software for computing the SI-values (e.g. Kelvin) from the measured voltage. In addition, the hex-file and a library is available for download.

## 5 Sensor modules

### 5.1 Temperature or Brightness AS01

Symbol	Unit	Value	Description
NAC	-	1	Needed analog channels per module
R	$\Omega$	2700	pull-up resistor
xS	mm	9	Standard x-coordinate of temperature sensor T
yS	mm	8	Standard y-coordinate of temperature sensor T
xSa	mm	8	Alternate x-coordinate of brightness sensor LR
ySa	mm	2	Alternate y-coordinate of brightness sensor LR



5: AS01

#### 5.1.1 Temperature sensor AS01T

The AS01T is delivered with the mounted KTY82-210 sensor. Note that the mounting hole situated next to the sensor element is designed as a heat probe and is connected to a large pad on the bottom side for optimal thermal connection with the surface of interest. Refer to the datasheet of the KTY82-210 for further information or simply use the modularis AS-library.

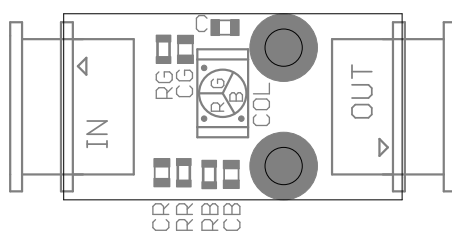
#### 5.1.2 Brightness sensor AS01L

The AS01L is delivered with the mounted APDS-9006-020 ambient light photo sensor. Refer to the datasheet for further information.

## 5.2 Color AS02

The module AS02 is delivered with a mounted KPS-5130PD7C color sensor. Refer to the datasheet for further information.

Symbol	Unit	Value	Description
NAC	-	3	Needed analog channels per module
RR, RG, RB	$\Omega$	220000	pull-down resistors
CR, CG, CB	nF	100	low-pass capacitors
xS	mm	9.5	x-coordinate of Colorsensor COL
yS	mm	6	y-coordinate of Colorsensor COL

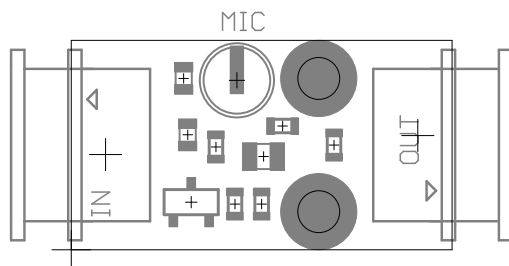


6: AS02

## 5.3 Microphone AS03

An omnidirectional electret microphone with a class A amplifier forms the AS03 module.

Symbol	Unit	Value	Description
NAC	-	1	Needed analog channels per module
xS	mm	9	Standard x-coordinate of Microphone
yS	mm	9	Standard y-coordinate of Microphone

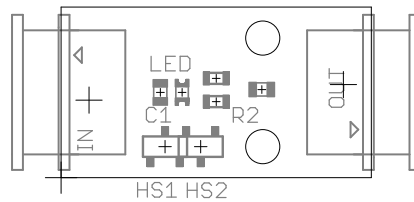


7: AS03

## 5.4 Hall-Effect Based Position Sensors AS04

An onboard LED shows the state of the magnetic switch. The LED lights up if the sensor's switch is closed to GND.

Symbol	Unit	Value	Description
NAC	-	1	Needed analog channels per module
xS	mm	7	x-coordinate of omnipolar hall-effect switch HS1
yS	mm	2	y-coordinate of omnipolar hall-effect switch HS1
xSa	mm	9	x-coordinate of unipolar hall-effect switch HS2
ySa	mm	2	y-coordinate of unipolar hall-effect switch HS2
xL	mm	8	x-coordinate of LED
yL	mm	6	y-coordinate of LED



8: AS04

### 5.4.1 Omnipolar Sensor AS04\_O

The digital magnetic field sensor AH1802 is mounted on the type AS04\_O at position HS1. The sensor responds to both magnetic poles. Refer to the datasheet for further information or contact us.

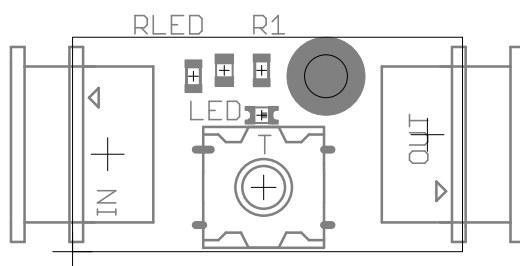
### 5.4.2 Unipolar Sensor AS04\_U

The digital magnetic field sensor SS343RT is mounted on the type AS04\_U at position HS2. The sensor responds to magnetic north-poles directed to the marking on the package. Refer to the datasheet for further information or contact us.

## 5.5 Tactile Switch Module AS05

An onboard LED shows the state of the tactile switch type KSC222J<sup>4</sup>. The LED lights up if the switch is pressed.

Symbol	Unit	Value	Description
NAC	-	1	Needed analog channels per module
xS	mm	10	x-coordinate of tactile switch T
yS	mm	3	y-coordinate of tactile switch T
xL	mm	10	x-coordinate of LED
yL	mm	7	y-coordinate of LED



9: AS05

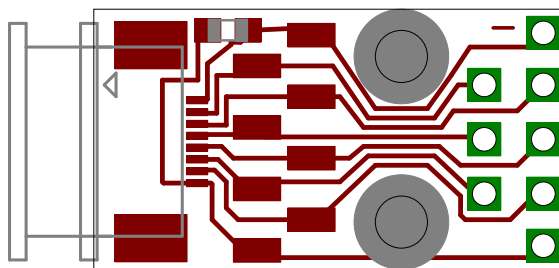
<sup>4</sup>If other tactile characteristics are desired, feel free and contact us.



## 5.6 Analog Adaptor AS06

Breakout module for interfacing 0 - 5 V voltage sources to your Modularis setup via AS-Connector. There are either THT-holes or simple SMD-PADS available. The GND-hole is marked by a minus. Refer to section 4.1 for the further signal assignment.

Symbol	Unit	Value	Description
NAC	-	1-6	Needed analog channels per module



10: AS06

## 6 Coming soon and contact

### 6.1 Coming soon

The variety of the module series AS will be enriched soon by the following modules:

- 16 Bit 100kSps ADC module
- Humidity sensor with NAC = 2
- analog amplifiers for superior signal conditioning capabilities

### 6.2 Support

For questions, innovations or any other support issue feel free and contact us:

[kundenservice@aevum-mechatronik.de](mailto:kundenservice@aevum-mechatronik.de)