AMS 4506
Miniaturized Wireless Bluetooth 4.2 Barometric Pressure Transmitter

FEATURES

- **Calibrated and temperature compensated**
- **Mobile wireless operations**
- **Bluetooth Low Energy 4.2 signal transmission**
- **Supply voltage range 1,7 .. 3,6 V**
- **24 bit ADC**
- **Battery powered (CR2032)**
- **Ready-to-use, simple and quick**
- **RoHS und REACH compliant**

GENERAL DESCRIPTION

The miniaturized sensors of the AMS 4506 series are ready-to-use, barometric pressure transmitters with Bluetooth interface for wireless data transmission via Bluetooth Low Energy (BLE) 4.2. The sensors are operated with a coin cell battery (CR2032) and are calibrated, compensated and linearized. The sensors can be read out and configured via the Android app AMS 4506 (available for free download from the Google Play store). The AMS 4506 series is available as a barometric version with a standard pressure range of 300 to 1200 mbar and an extended pressure range of 10 to 2000 mbar. Upon customer request, the sensors can be modified. The range is about 100 m in free field.

TYPICAL APPLICATIONS

- **Barometric pressure sensing**
- **Vacuum measurement**

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MAXIMUM RATINGS

Parameter	Symbol	Min.	Typ.	Max.	Unit
Maximum supply voltage	V_{cc}	1.7	3	3.6	V
Storage temperature (without battery)	T_{amb}	-20		85	°C
Operating temperature	T_{op}	0		85	

***Table 1*: Maximum ratings**

ELECTRICAL SPECIFCATIONS (Operating range)

All Parameters apply to V_{cc} = 3 V and Top = 25 °C, unless otherwise stated.

Parameter		Minimum	Typical	Maximum	Unit
Supply Voltage (V_{cc})		1.7		3.6	V
Operating Temperature Range		0		85	°C
Standard Pressure Range		300		1200	mbar
Extended Pressure Range[1)]		10		2000	mbar
Absolute Accuracy @25 °C (300-1200 mbar)		-2		+2	mbar
Absolute Accuracy @0-85 °C (300-1200 mbar)		-4		+4	mbar
Maximum Error @1.7 V to 3.6 V			±0.5		mbar
ADC Resolution			24		bit
Current Consumption[2)]	OSR 8192		20.09		µA
	4096		10.05		
	2048		5.02		
	1024		2.51		
	512		1.26		
	256		0.63		
Peak Supply Current [3)]			1.25		mA
Long Term Stability			±1		%mbar/a
Resolution RMS Pressure	OSR 8192		0.016		mbar
	4096		0.021		
	2048		0.028		
	1024		0.039		
	512		0.062		
	256		0.11		
Absolute Accuracy @25 °C		-1		+1	°C
Absolute Accuracy @0-85 °C		-2		+2	°C
Maximum Error @1.7 V to 3.6 V			±0.3		°C
Resolution RMS Temperature	OSR 8192		0.002		°C
	4096		0.003		
	2048		0.004		
	1024		0.006		
	512		0.009		
	256		0.012		
Wireless Protocol		Bluetooth Low Energy 4.2			

Signal Transmission Distance	ca. 20 Meters[4)]			
Receiver Operating System	Android™ 6.0 (Marshmallow) or above			
Current Consumption in Advertising Mode[5)]		22	25	µA
Current Consumption in Advertising Mode[6)]		5	7	µA
Current Consumption in Connected Mode[7)]		0.5	0.6	mA
Battery Life CR2032 (230 mAh)	ca. 1 Jahr[8)]			
Battery Life CR2032 (230 mAh)	ca. 3 Jahre[9)]			
Storage Temperature (without Battery)	-20		85	°C
Weight		20		Gram

***Table 2*: Specifications**

SPECIFICATION NOTES

1) Linear Range of ADC.
2) Sampling Rate of 1 s.
3) During conversion.
4) Depending on the environment of the sensor and the receiving antenna of the receiver.
5) At an advertising interval of 1 s and a sampling rate of 5 s.
6) At an advertising interval of 5 s and a sampling rate of 120 s.
7) At a min. connection interval of 100 ms und max. 200 ms and a sampling rate of 1 s.
8) If the sensor is only operating in advertising mode with the settings as indicated in point 5.
9) If the sensor is only operating in advertising mode with the settings as indicated in point 6.

GENERAL NOTES

The connection interval can be changed by the manufacturer from 7,5 ms to 4 s.
Default data sampling rate is set to 5 s, which can be adjusted from 1 s to 500 s in the android smartphone AMS 4506 App. The default resolution for pressure and temperature is 4096 OSR.
On request a software manual can be provided by the manufacturer, so a sensor readout and configuration can be made without the AMS 4506 App
Battery life depends on its capacity, operating temperature and signal transmission interval.
Temperature can impact battery capacity retention even in idle. Check battery specifications for more details.

Measurement Accuracy and Errors

The error curves indicate the values for the absolute pressure sensors used for the AMS 4506. These are typical error values, not individually checked during production. The data displayed in the app may differ from the measured values read, e.g. by the resolution of the display.

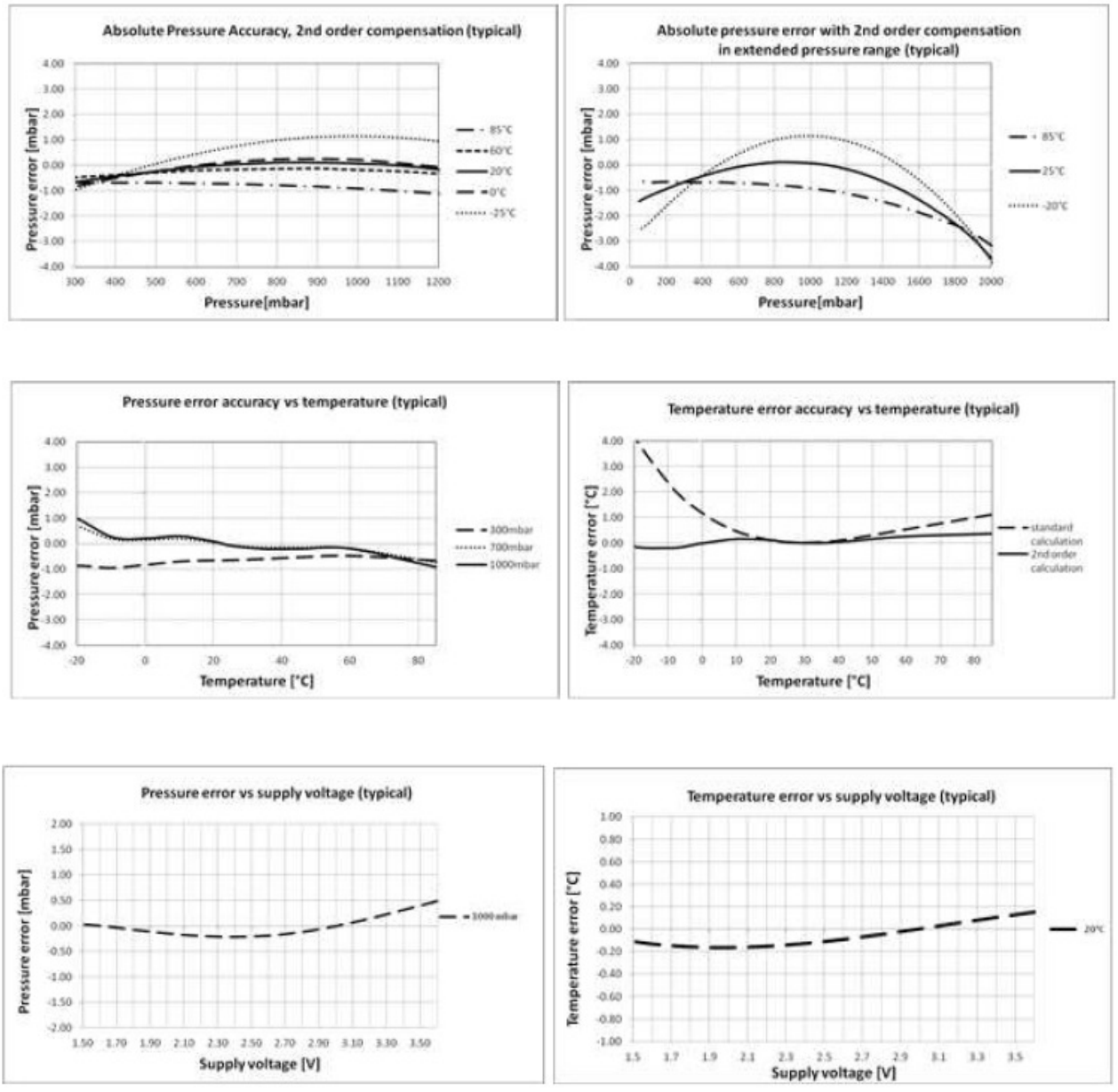


Figure 1: **Error of the sensor components**

FUNCTIONAL DESCRIPTION

The AMS 4506 wireless pressure transmitter is based on the MS5637 barometric pressure sensor. This sensor has a 24 bit ADC, allowing a height resolution of 13 cm. The pressure to be measured reaches the sensor element through the whole at the lower left edge.

Communication takes place via Bluetooth Low Energy 4.2 (2.4 GHz). After inserting the battery and starting the app AMS 4506, the name and the measured values of the sensor are sent to the client (user) in Advertising-Mode. If you want to reconfigure the displayed sensor, the user must click on the "Sensor Configuration" field via the menu button (≡). The sensor connects with the app and the sensor can now be configured individually. The measured values can be saved at any time over the app in a CSV file for further processing. The lifetime depends strongly on the transmission mode and the way of using the sensor.

In Connected Mode, the sensor uses Bluetooth Notification to send the data to the client. The sampling rate in the app can be used to set the interval between these notifications. There are basically three possibilities of data processing:

1) Readout and configuration of the sensor via the AMS 4516 App.

2) Readout of the sensor via a Bluetooth Gateway with firmware.

GETTING STARTED

The AMS 4506 pressure transmitters are quick and easy to use with two through-the-housing wholes (Ø 3.2 mm) - mountable e.g. by M3 screws. The plastic housing itself requires no maintenance except for the battery replacement.

The supply voltage is provided by a CR2032 battery (230 mAh). The battery holder is located on the circuit board under the lid. For this purpose, the housing must be opened; the board has to be taken out to install the battery in the designated battery holder. It is important to pay attention to the correct polarity of the battery. The purpose of the pressure connecting ports here, is only for easier opening of the housing. In order to remove the cover from the housing, the two ports must be pulled slightly obliquely upwards.

To read the data of the sensor, the App AMS 4506, provided by AMSYS on Google Play Store is needed. The app description can be found on the AMSYS GmbH & Co. KG homepage: www.amsys-sensor.com.

PACKAGE DIMENSIONS

The housing consists of two parts: basic housing and cover. The sensor only fits indoor installation.

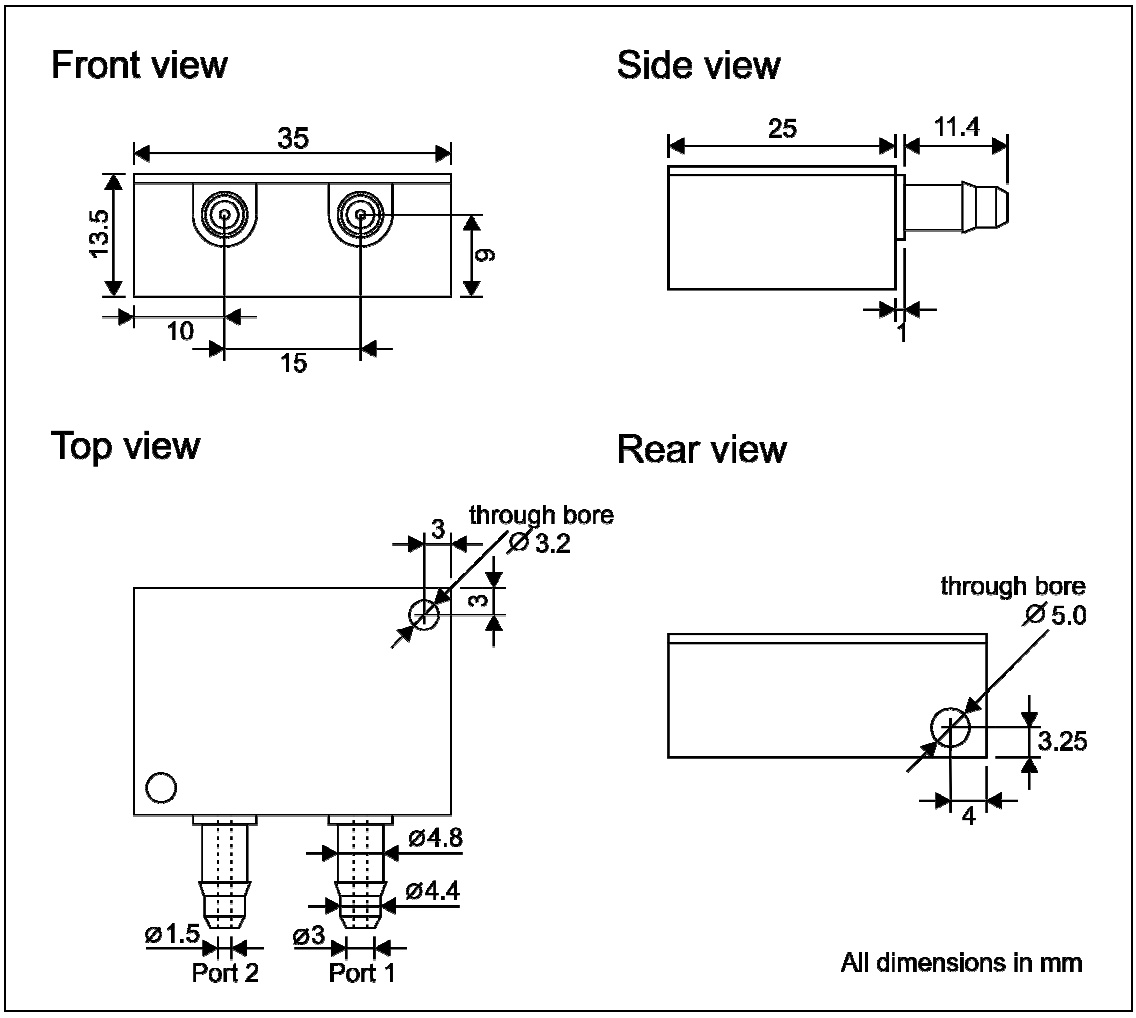
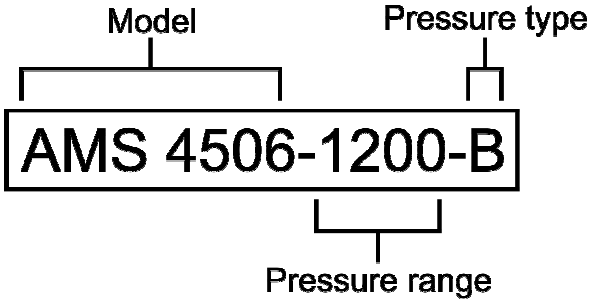


Figure 2: Dimensions of AMS 4506 package

ORDERING INFORMATIONS

Ordering code:



PRASSURE RANGE

Pressure range code	mbar	psi	kPa
1200	1200	17.40	120

***Table 3*: Pressure ranges**

PRESSURE TYPE

Pressure type code	Available pressure ranges
B barometric (absolute)	300 .. 1200 mbar

***Table 4*: Pressure types**

ADDITIONAL EQUIPMENT

Ordering code	Description
App	Android App for reading out and configuring the sensors
Software Manual	On demand for software development

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