



App AMS 4506 Description

General Description

The AMS 4506 app is suitable for smartphones and tablets with Android 8.0+ operating systems and is required for communication with the AMS 4506 wireless pressure sensor.

Download the App

The app can be searched and downloaded from the Google Play Store using the search terms AM-SYS or AMS 4506. During the installation and when starting the app, the user is asked to switch on the Bluetooth and the GPS function (for localisation) of the smartphone/tablet. The GPS is necessary for successful Bluetooth operation. These accesses must be confirmed by the user when downloading the app.

After completing the installation, the app icon with the name "AMS 4506" appears on the smartphone/tablet. Clicking on the icon will launch the app and display a list of detected wireless AMS 4506 Bluetooth devices in the environment (Fig. 1). Devices are detected by the automatic scanning process that starts when the app starts. When you are on the overview page, the most important operating data of the sensor are displayed in a brief overview under the sensor name. As long as the app scans in real time for existing AMS 4506 sensors, the message: "**App is scanning for Bluetooth devices**" appears on the screen under the app name AMS 4506. Clicking on one or more sensors from the displayed list stops the scanning in the background and the message: "**Scanning for Bluetooth devices stopped**" is displayed. The selected sensors are marked with a green tick in the checkbox.

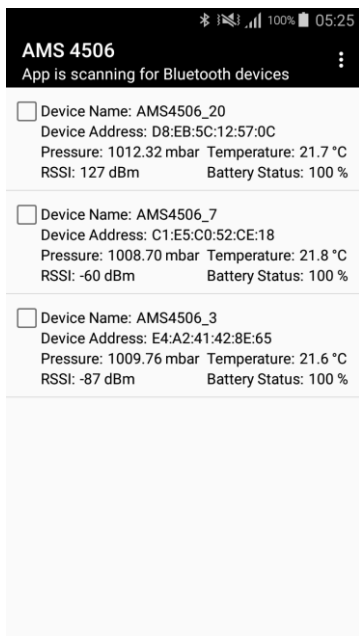


Figure 1: Main Page

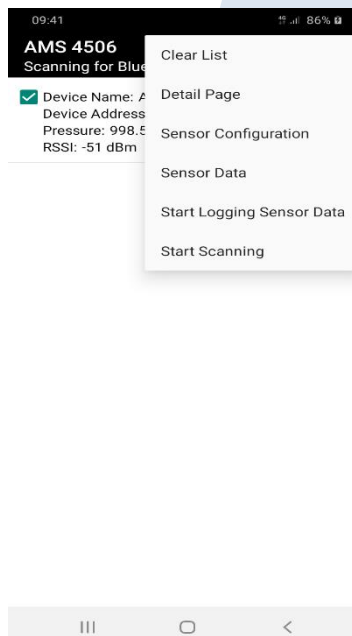


Figure 2: Main Page after clicking the menu button



Figure 3: Detail Page (graphical view)



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The user now has various options via the menu button (☰) (Fig. 2). It is possible to look more closely at the data of a sensor and to follow the behaviour in graphical representation. For individual measurement tracking of a graphic representation, "**Detail Page**" must be selected in the menu button (☰). This will open a new view and the name of the selected sensor and the real-time advertising/broadcasting data will appear at the top of the display (Fig. 3).

Below, the measured values for pressure and temperature are also displayed in separate graphs over time. The timeline is given in hours: minutes: seconds

Multiple sensors can not be selected for detail view. But if you want to select some sensors from a large list of sensors, you have to click on "**Show selected devices**" via the menu button. Then only the previously selected sensors in the list with the measurement data appear in a short form as shown in Figure 2. If a sensor can not be selected, it is already in the selection list. If all sensors are to be displayed again, click on "**Clear List**". To start the logging of one or more sensors, first select the sensors from the list and then click on "**Start Logging Sensor Data**". The user is then asked to choose a storage location and must confirm this by clicking on "Save". It is **important that the name of the file, which is specified when saving, is retained and not changed**. If logging has been started, a short message "**Logging started**" appears on the display, otherwise an error message appears. If the logging of one or several sensors has been started, you can use the option "**Show Logging Devices**" in the menu to display the current logged devices. This is only possible on the main page. The menu options listed here are only displayed if one or more sensors are selected from the list.

To switch to another page, please only use the options in the menus and not the return button of the mobile/tablet.

The analysis of data can be done either in the not connected Advertising/Broadcasting mode or in the connected Connection mode. If the transmitter and receiver want to establish a secure Bluetooth connection and want to counteract the loss of data packets, the connection in "connected" mode is to be preferred. However, this connection also has a higher energy consumption compared to the Advertising/Broadcasting mode.

Description of the existing menu options on the Data- and Detail pages

On the left next to the displayed measured values is the menu button (☰) at the top. By clicking on the menu button or swiping on the display to the right, the various options of the Detail page (Fig. 4) and Data page (Fig. 8) are displayed. Here are the options explained:

- Start Scanning: Starts scanning for available AMS wireless devices, without to be connected with these.
- Stop Scanning: Stops the scanning for available AMS wireless devices.
- Start Logging Sensor Data: User is asked to select a storage location and must confirm this by clicking on "Save". **It is important that the name of the file, which is specified when saving, is retained and not changed**. There the measured values for pressure and temperature are stored in a *.csv file. The first column shows the date and time the data was recorded (system time of the mobile/tablet). The second and third columns show the pressure and temperature values. The fourth column shows the battery level (Fig. 5). The file can be opened via an Excel app for further processing.



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Stop Logging
Sensor Data:

This command stops logging the readings in the above mentioned file.

Sensor
Configuration:

Change to the configuration page. Here it is possible to change the configuration settings of the sensor. For this, the mobile device must first establish a Bluetooth connection with the sensor. If the connection has been established successfully, the words **sensor name + "Connected"** and below **"Bluetooth Services Discovered"** must be displayed at the top of the display (*Fig. 6*). If this is not the case and if the **sensor name + "Disconnected"** is displayed at the top of the display after opening the page, then click on **"Connect"** via the menu button (:) until the lettering changes to **"Connected"**. This is because only in Connection mode, the sensor can be configured.

For all possible configuration settings, there is an info icon with explanations on the right side. The sensor configurations can not be changed when the sensor is "logging".

Sensor Data:

Change to the data page. Here, the current sensor readings are displayed in real time via a secure Bluetooth connection via Bluetooth notification (*Fig. 7*). The sensor will send the current pressure and temperature readings every 5 seconds (default, but can be changed from the Configuration page under **"Set sampling rate for the Bluetooth notification in ms"**). The data is displayed numerically and graphically below as on the Detail page (*Fig. 7*). If you want to stop the real-time transmission of the measured values, you have to press **"Disable Bluetooth Notification"** in the menu. When you close the page, all actions such as logging or Bluetooth notification are stopped and the Bluetooth connection is disconnected except when switching to the Configuration page only the connection will be still established.

Overview Page:

Switching to the Main page.

Detail Page:

Switching to the Detail page.

Set Limit Line
Pressure:

You can use this command to set limits for the measurements. In the displayed dialog box, the critical value for the pressure must be entered. **Floating numbers must be entered with a point**. The limit line is shown as a red dashed line in the graphic view and the value is displayed on the right above the line. If the limit value is far outside the currently measured values, it will only be displayed graphically if this value lies within the tolerance of the graph.

Remove Limit Line:

Removes the Limit Line.

Change Unit:

In the dialog box, you can select the preferred unit to appear at the top of the display. There are three choices: mbar, psi and hpa. Preconfigured is mbar (*Fig. 9*).



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- Connect: Establishes a Bluetooth connection.
- Disconnect: Disconnects the Bluetooth connection.
- Enable Bluetooth Notification: Enables Bluetooth notification. The transmission interval has been predefined to 1 second by the manufacturer. The measured sensor data and the battery status are numerically displayed at the top of the display and the sensor data are also displayed graphically and are permanently updated.
- Disable Bluetooth Notification: Disables the Bluetooth notification.
- Enable Alarm Manager: Enables a ring tone alarm when the limit line limit has been exceeded. If this value falls below again then the Alarm Manager deactivates again. To activate the Alarm Manager, the limit line must first be activated.
- Disable Alarm Manager: Disables the Alarm Manager.

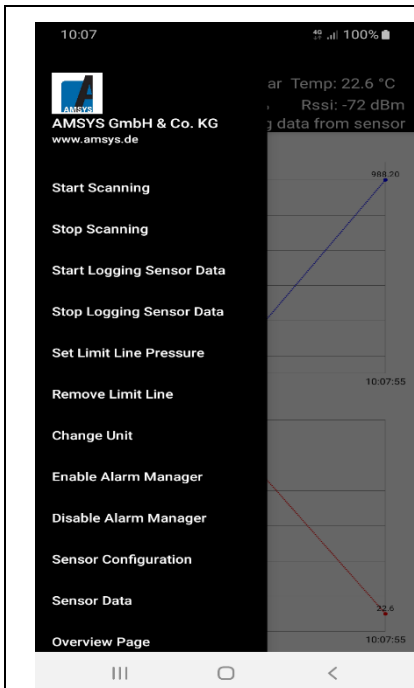


Figure 4: Menu options of Detail Page

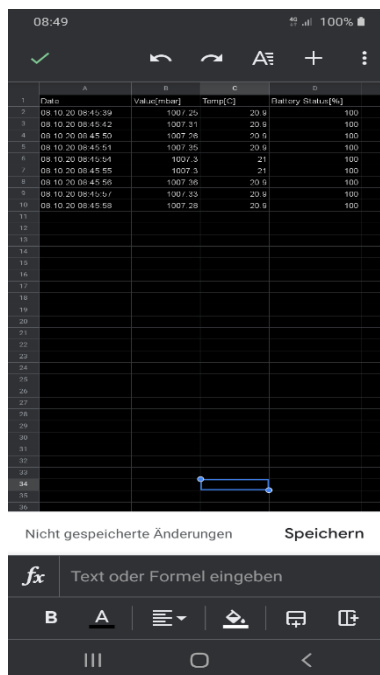


Figure 5: *.csv file after logging

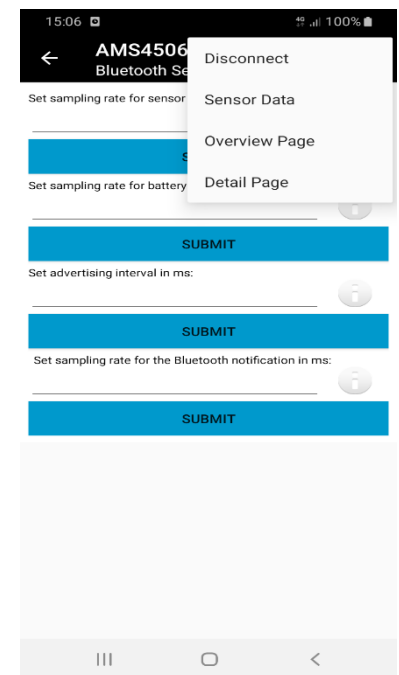


Figure 6: Configuration Page



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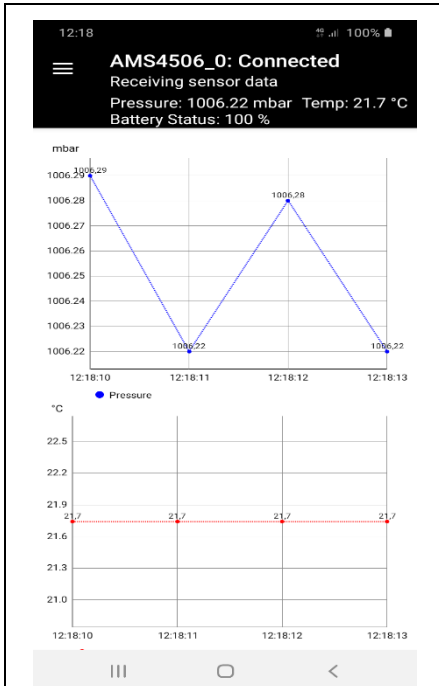


Figure 7: Data Page

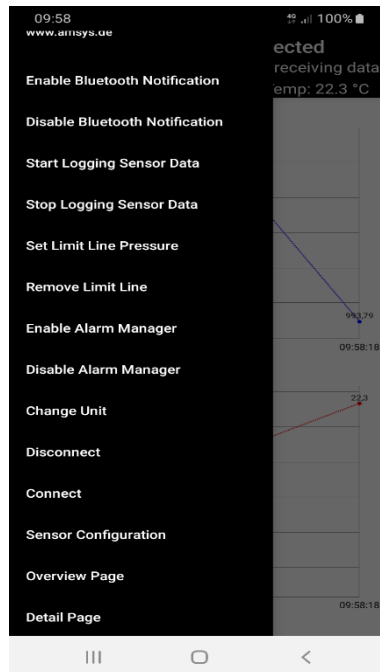


Figure 8: Data Page after clicking on the menu button

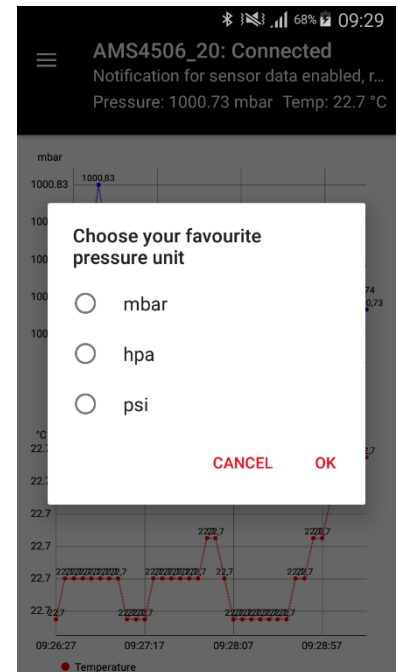


Figure 9: Data Page after clicking on „Change Unit”

Notes for the sensor configuration

- 1) The Advertising interval can be set between 20 ms and 10 s in ms (2 s default).
- 2) The sampling rate for the sensor readings can be set in the range of 100 ms to 500 seconds in ms (5 s default).
- 3) The sampling rate for the battery status can be set in the range of 1 to 500 seconds (120 s default).
- 4) The sampling rate for the Bluetooth notification can be set in the range of 100 ms to 500 seconds in ms (1 s default).
- 5) The default value for the minimum respectively maximum connection interval is set to 100 ms respectively 200 ms.

Conclusion

With the Android app AMS 4506, the measured values of the barometric pressure sensor AMS 4506 can be logged, read out and graphically displayed. In addition, some sensor configurations can be customized. The AMS 4506 app can be downloaded for free from the Google Play Store. AMSYS also offers a Bluetooth gateway (Fig. 10). On request at AMSYS the app / Gateway can be customized.



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Bluetooth Gateway Description

In addition to the query of the measurement data via a mobile device explained here, in conjunction with an app, the sensor data can also be read out and stored via a gateway.

The screenshot displays the AMSYS Node-RED Dashboard interface. The top navigation bar includes 'Home' and the date/time '31.3.2020, 12:56:02'. The main content area is titled 'Bluetooth Status: Scanning for Bluetooth devices' and features a 'BLE Scanning ON/OFF' toggle set to 'ON' and a 'SHOW LOGFILE' button. Below this, there are input fields for 'Enter critical minimum pressure', 'Enter critical maximum pressure', and 'Enter sampling rate: 3', each with a corresponding 'SUBMIT' or 'SET' button. A table lists five connected devices with their respective parameters:

Nr.	Select	Device Name	Pressure Range	Min. Pressure	Max. Pressure	Address	Pressure	Temperature	Rssi	Battery Level	Chart View	Start Logging	Stop Logging
1	<input type="checkbox"/>	AMS4506_20	10-2000	100	1000	d8:eb:5c:12:57:0c	1016.11	21.82	-85	100			
2	<input type="checkbox"/>	AMS4516_4	0-100	0	100	c9:eb:26:56:f5:bc	0.00	59.67	-80	100			
3	<input type="checkbox"/>	AMS45167	0-100	0	100	e9:42:96:4e:d7:45	49.99	19.14	-82	100			
4	<input type="checkbox"/>	AMS4506_7	10-2000	10	2000	c1:e5:c0:52:ce:18	1013.00	22.17	-79	100			
5	<input type="checkbox"/>	AMS4506_6	10-2000	10	2000	ff:f7:93:eb:e9:13	1012.88	22.08	-73	100			

The bottom screenshot shows the 'Lab' view for device 'AMS4506_6' at '26.3.2020, 11:22:51'. It features two large gauge charts: 'Pressure [mbar]' showing a value of 1005.07 and 'Temperature [°C]' showing a value of 21.27. Below each gauge is a corresponding line chart showing the data trend over time from 11:22:34 to 11:22:50. A 'BACK TO OVERVIEW' button is visible in the top right corner.



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The screenshot shows a web browser window displaying the Node-RED Dashboard. The address bar shows the URL: 192.168.4.207:1880/amsys_gateway/#/I/2?socketid=X0EYsM-c6BEzEjAFAAAA. The page title is "Logfile 26.3.2020, 11:24:04". On the left, there is a logo for AMSYS GmbH & Co. KG with the website URL www.amsys.de. The main content area displays a table of measurement data:

Date/Time;	Name;	Pressure[mbar];	Temperature[°C];
2020-3-26 08:27:39;	AMS4506_6;	1005.56;	20.96;
2020-3-26 08:27:49;	AMS4506_6;	1005.31;	20.98;
2020-3-26 08:27:54;	AMS4506_6;	1004.94;	20.97;
2020-3-26 08:27:59;	AMS4506_6;	1005.14;	20.97;

Below the table, a dialog box titled "Öffnen von AMS45XX_Logfile.csv" is open, asking the user to open the file "AMS45XX_Logfile.csv" (338 Bytes). The dialog offers options for how to handle the file: "Öffnen mit Microsoft Excel (Standard)", "Datei speichern" (selected), and "Für Dateien dieses Typs immer diese Aktion ausführen". Buttons for "OK" and "Abbrechen" are visible.

On the right side of the dashboard, there are three buttons: "CLEAR LOGFILE" (red), "BACK TO OVERVIEW" (blue), and "SAVE LOGFILE" (blue).

Figure 10: Visualization of the measurement results via the gateway

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