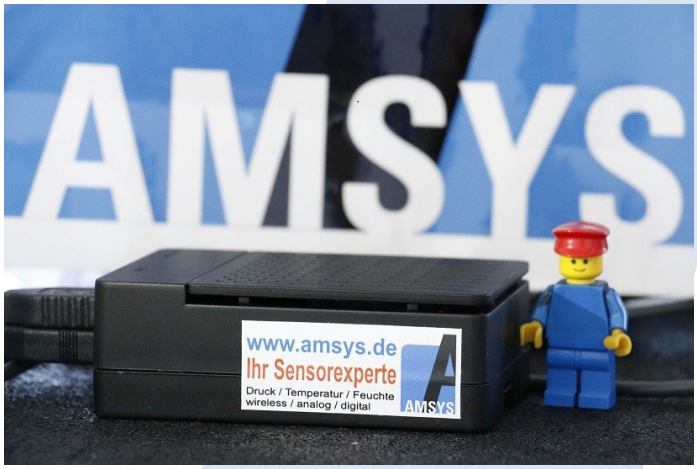
Description of the AMS Bluetooth gateway

General description

The Bluetooth gateway designed by AMSYS GmbH & Co. KG, Germany, is used for the visualization and monitoring of wireless Bluetooth sensors and can be used indoor and in weather-protected outdoor areas.



Use of the gateway

Using the gateway Bluetooth sensors can be displayed in tabular and graphic form. In addition, measurements such as pressure and temperature can be plotted (logged) over time.

The data is saved on the gateway in a dedicated log file and can be displayed, processed and saved in the web application. The default format for saving the data on a local computer is a .csv file that can be further processed using an EXCEL program.

Technical specifications

Parameter	Typical	Unit
Power supply	5	V
Operating temperature	0–50	°C
Current consumption	2.5	A
Processor	Broadcom BCM2837B0	
Memory	1GB LPDDR2 SDRAM	
Connectivity	2.4 GHz and 5 GHz IEEE 802.11.b/g/n/ac wireless LAN	
	Bluetooth 4.2, BLE	
	Gigabit Ethernet via USB 2.0 (max. throughput 300 Mbps)	
	4 x USB 2.0	
	1 x HDMI	
Hard disk	16 GB SD card	
Dimensions	6.2 x 9 x 3 cm	

***Figure 1*: technical specifications (Raspberry Pi 3B+).**

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Installation

The gateway is based on a Linux operating system and can communicate with the PC via the local network and an Internet connection. To communicate with the PC the gateway must be integrated into the local home network using a network cable. The included gateway power pack is plugged into the micro USB connector and the button on the power cable is pressed to switch the gateway on.
Unless otherwise configured, the computer's DHCP server will automatically assign an IP4 address to the gateway. After successfully assigning the IP4 address, the address must be entered in the web browser on the PC in the address bar and the port 1880/amsys_gateway added (e.g.: 192.168.X.X:1880/amsys_gateway) as described below for the respective operating system. The gateway's graphic interface then opens in table view in the Internet browser.

Installation for Windows

To connect the gateway to the work computer, both devices must be in the same local network and switched on. A network tool such as the free SoftPerfect Network Scanner (*Figure 2/3*) is also required; this finds the gateway's dynamically assigned IP address in the network. Optionally, the "arp -a" command can be used to display all IP4 addresses and the associated physical MAC addresses using the Windows command prompt (cmd.exe) (*Figure 5/6*). Look for the MAC address that begins with **b8: 27: eb: xx: xx: xx.**

Installation for Linux

To connect the gateway to the work computer, both devices must be in the same local network and switched on. Open a terminal window and execute the "arp -a" command. With this command all IP4 addresses and the corresponding physical MAC addresses are displayed. Look for the MAC address that begins with "**b8: 27: eb: xx: xx: xx**".

***Figure 2*: Windows system command prompt.**

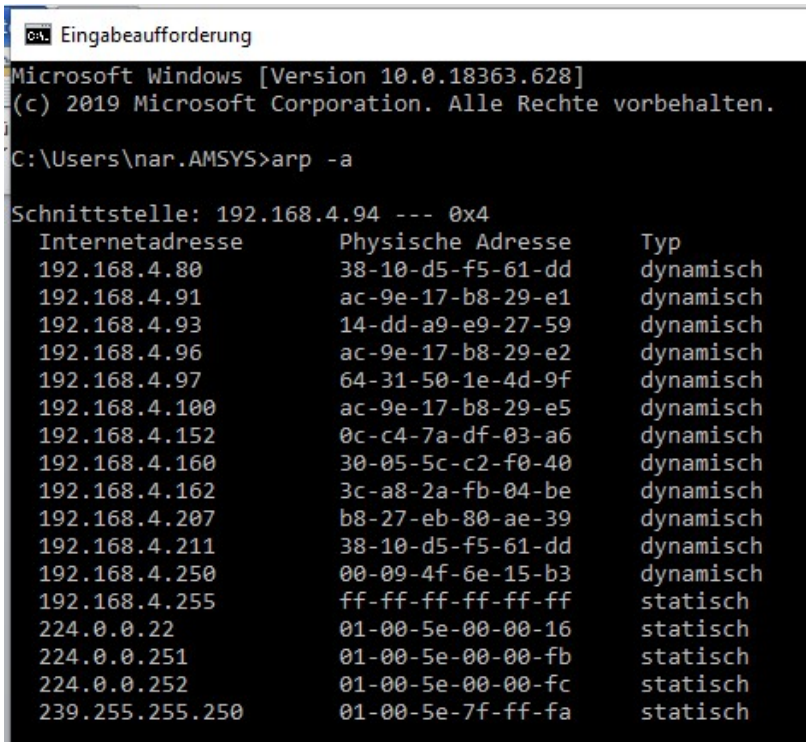

***Figure 3*: output for command arp –a.**

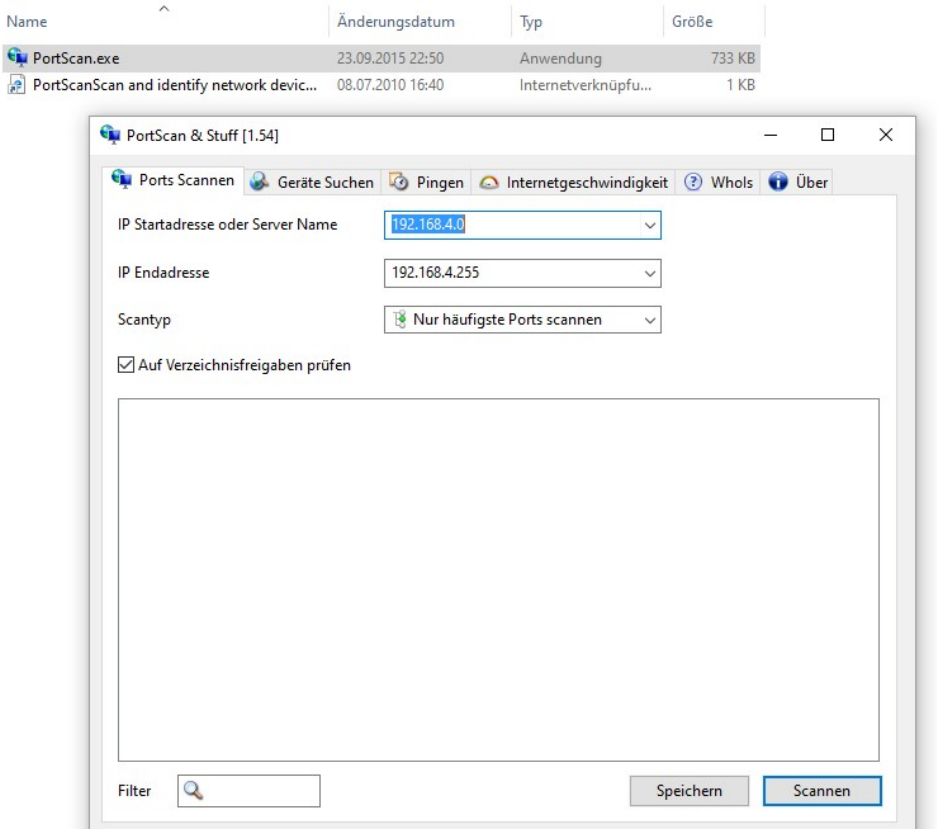

***Figure 4*: PortScan program.**

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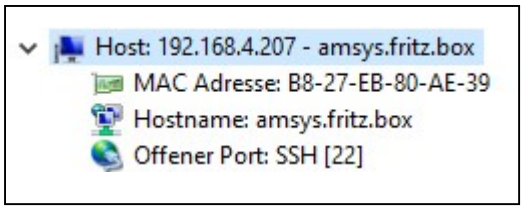

***Figure 5*: PortScan output.**

Description of the interface

Switching the gateway on/off and resetting it

Once both devices have been connected, the measurement data can be displayed using a web browser.

At the top of the screen there is a light blue info bar with the current date and time, as well as a navigation menu. By clicking the menu, the various options for this page open. The gateway can be restarted via "Reboot Gateway" and the software is restarted with "Restart Software". A restart of the software or the gateway may be necessary if the software should no longer respond. To switch off the gateway, click on "Shutdown Gateway" and then press the button on the power plug. Only then is the gateway properly switched off. It is switched on using the button on the power plug.

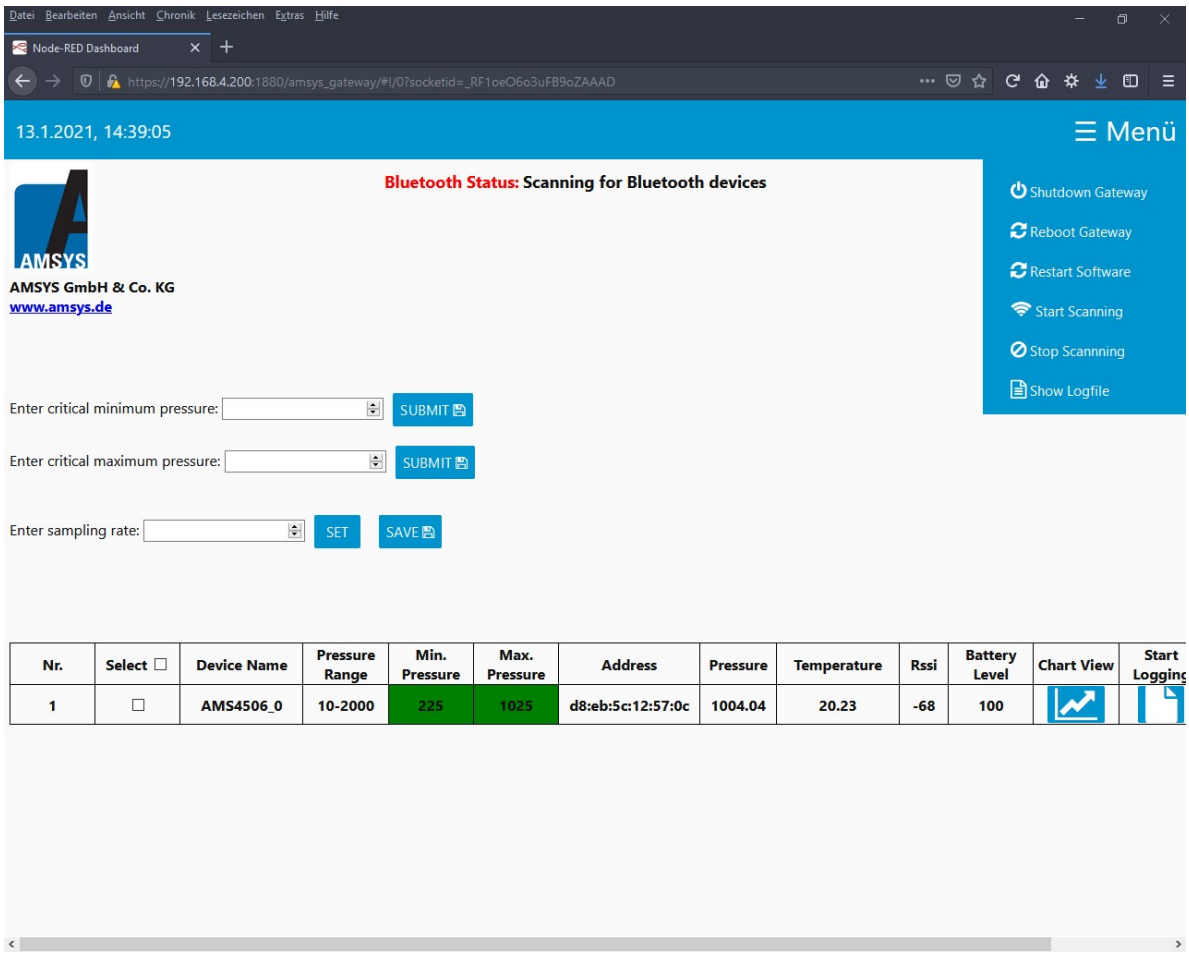

***Figure 6*: table view.**

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In the upper middle of the screen there is a text field that shows the current Bluetooth status regarding the search and writing of the Bluetooth sensors. The menu option "Start Scanning" or "Stop Scanning" is used to scan for Bluetooth sensors or to stop scanning. The picture is frozen when the scanning is stopped; restarting scanning updates the table and the search for Bluetooth devices resumes. The log file is displayed with "**Show Logfile**".

Setting the minimum and maximum pressure

There are three input fields under the AMSYS logo on the left (minimum pressure, maximum pressure and sampling rate). In the first input field the minimum pressure to be monitored can be entered in mbar. Below this is the input field for the maximum pressure to be monitored, also in mbar. The values to be entered should not be above or below the sensor's pressure range and are both preset to the minimum and maximum pressure range of the respective sensor. The entered values are then saved and displayed in the **Minimum/Maximum Pressure** column. If the critical pressure values are undershot or overshot, the green background of these columns turns red.]
When moving the mouse over the input field, the pressure unit to be used is displayed.

Selecting sensors

The sensors can be selected in the **Select** column on the left next to the sensor name (**Device Name**). Clicking on top box in this column selects or deselects all sensors. The minimum/maximum pressure can be entered before or after sensor selection but must be confirmed by clicking the **Submit** button above the table. It may take a few seconds for the change to take effect.

Sampling rate

The third input field is used to determine the sampling rate of a sensor in seconds. The minimum or maximum sampling rate is noted in the respective sensor's datasheet.

A sensor is first selected in the **Select** column and this selection confirmed using the **SET** button next to the **Sampling rate** input field. Here, only one sensor can be selected at a time. The gateway connects to the selected sensor and changes its sampling rate. When the **Writing succeeded** message appears in the Bluetooth status bar, the new sampling rate has been successfully implemented but must still be saved with the **SAVE** button. Only then does the gateway again start scanning for sensors. Moving the mouse over the "**Device Name**" column, which contains the name of the sensor, the adjusted sampling rate and the advertising interval of the sensor are also displayed. This also applies to the other table fields where e.g. the measurement units are displayed.

Input errors, such as if no sensors have been selected or no value has been entered, are displayed in a red box and a note in the top right corner of the screen indicates an alert.

The table shows the name, address, pressure range, pressure value, temperature value, signal strength (RSSI) and the battery level of the sensor.

There are also seven further columns with the fields No., Select, Min. Pressure, Max. Pressure, Chart View, Start Logging and Stop Logging.

In the **Select** column those sensors can be selected that are to be configured. Clicking the top box in this column selects or deselects all sensors.

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Chart view

Chart View, displays a graphic of the selected sensor with a measuring gauge. Only one sensor can be displayed at a time in chart view (*Figure 7*). To select another sensor in chart view or return to table view, click on "**Back to Overview**" via the navigation menu at the top right.

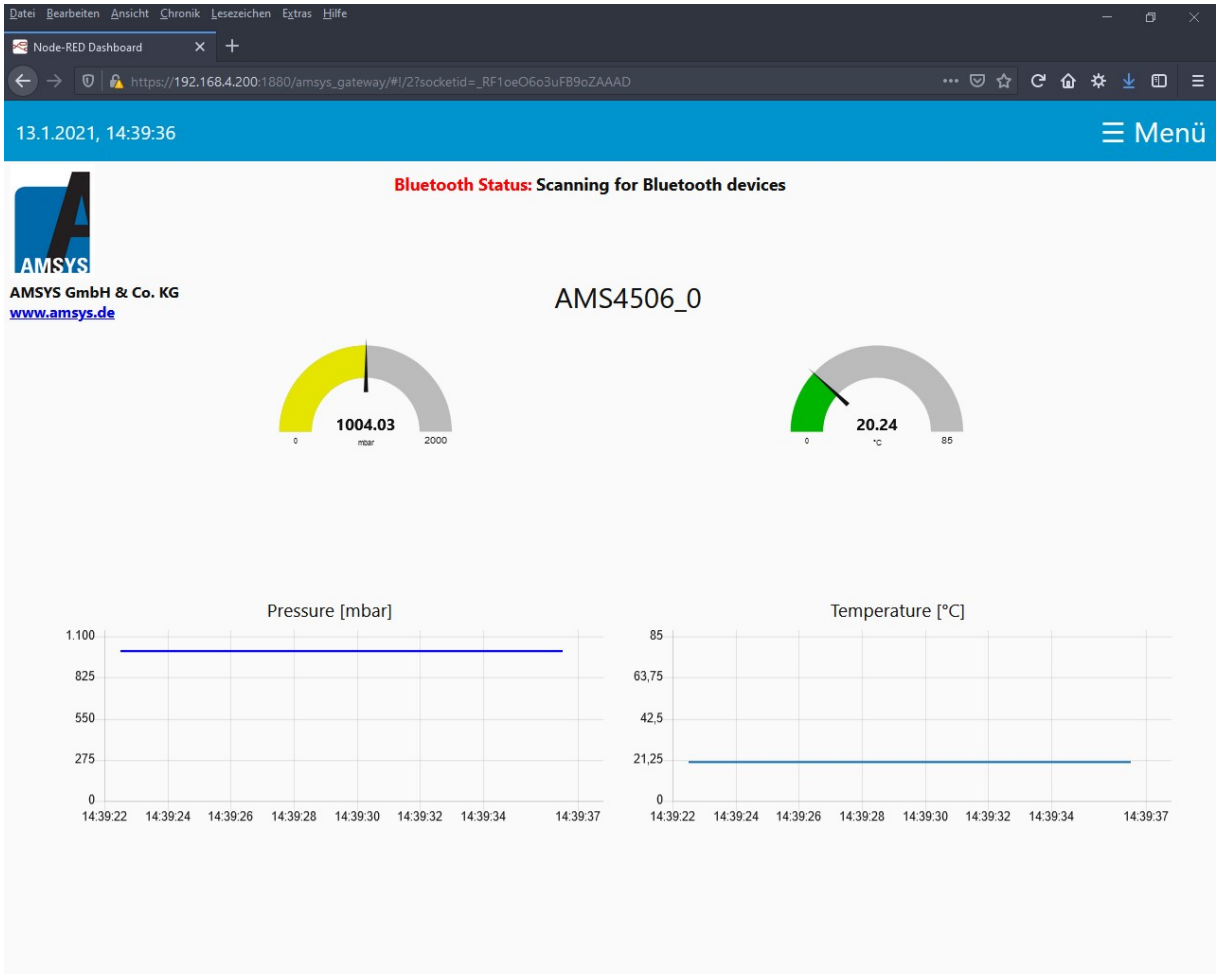

***Figure 7*: chart view.**

Logging data

Pressure and temperature logging with a time stamp in the dedicated log file can be initiated in the **Start Logging** columns in table view. When the corresponding icon is clicked, it turns red, signalling that this sensor is currently being logged. Clicking **Stop Logging** in the next column ends the save process and the icon changes back to its original colour. The log file can be displayed over the **"Show Logfile"** field in the navigation menu. A new window then opens in where the log file can be edited, cleared using "**Clear Logfile**" or saved on the local computer as a .csv file via "**Save Logfile**" (*Figure. 8*). Clicking on **"Back to Overview"** switches the screen back to the table view. The log file will be cleared automatically at a size of 10 Mbyte in order not to slow down the system too much. Before this happens, a warning is issued on the screen.

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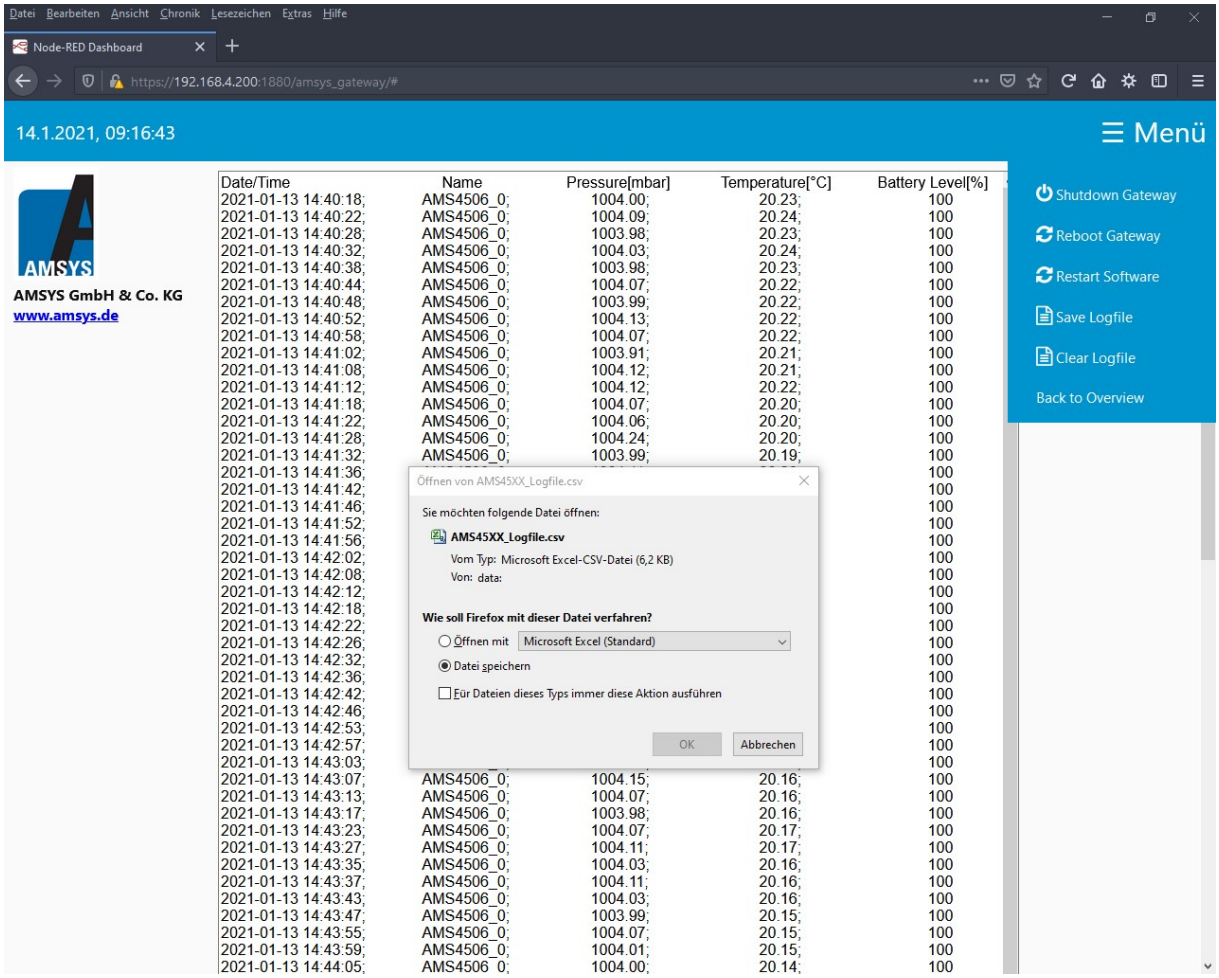

***Figure 8*: AMS 45XX log file.**

Summary

With the AMSYS Bluetooth gateway values measured by Bluetooth sensors can be saved, read out and displayed as a graphic. The AMSYS gateway is an extension of the AMSYS app; it establishes a connection to the customer's own network and enables fast processing of measurements made by the wireless sensors. Certain sensor configurations can also be individually set using the gateway.

AMSYS can customize the gateway firmware on request.

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