

SPA Panel

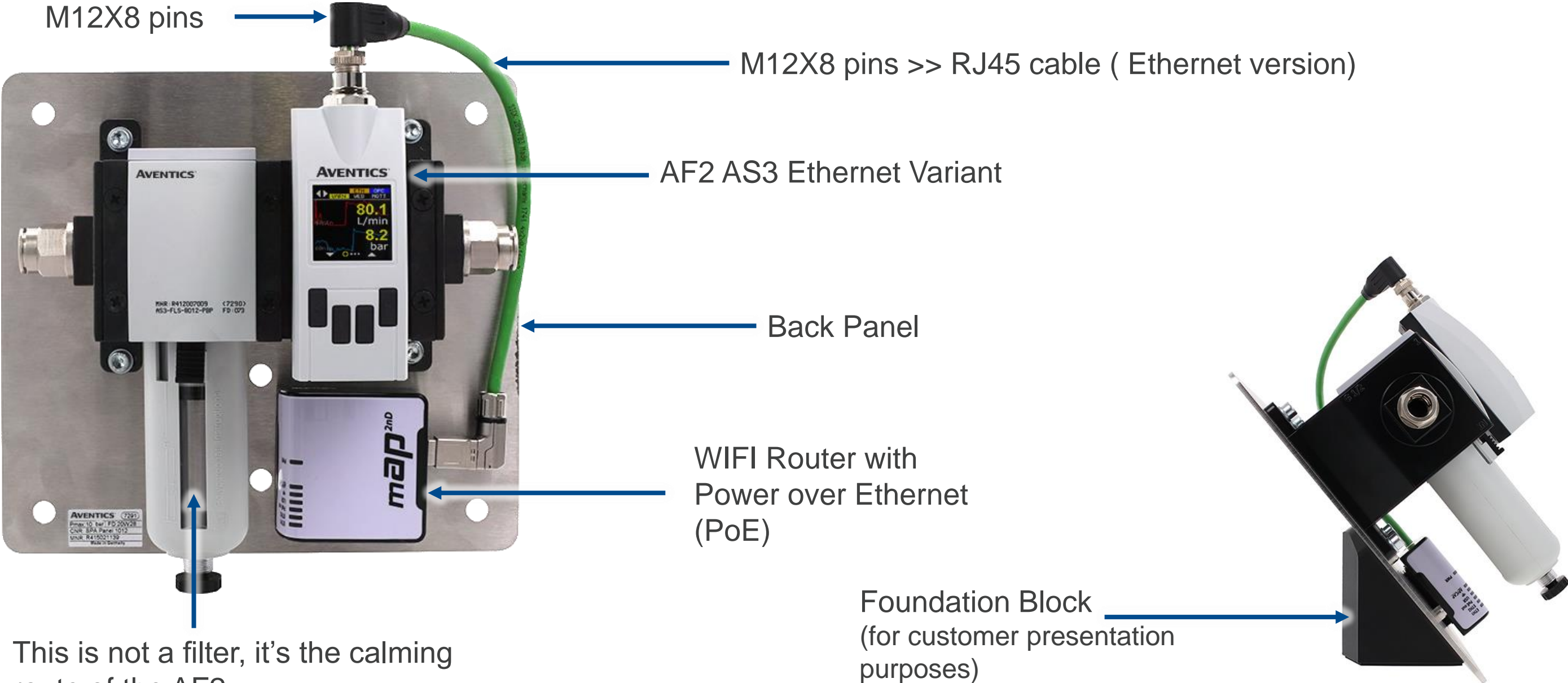
Smart Pneumatics Analyzer Panel



Contents

- 1 Details of SPA Panel Package – Hardware & Software
- 2 Possible ways of adapting into customer air line for demonstration
- 3 Detailing in Software based on capability and functions
- 4 Question & Answers
- 5 Summary

SPA Panel – Content



Package offer for SPA Panel AS3

AF2 Showcase and measurement tool (Software)

Material number R415021139

Lead time – 4-5 weeks ex-work SG



*Demo case colour will be in **black***

Overall size (mm)- Approx. 500X330X180

SPA Panel Software

- This Software could be used in combination with the SPA Panel and also with an AF2 Airflow Sensor
- The Software could be executed on a Windows Computer
- Functions Integrated:
 - Airflow and Pressure Charts
 - Air Consumption incl. Price
 - Leakage incl. Monitorization
 - CO2 Measurement
 - Sensor Statistics (Flow, Pressure & Temperature)
 - AF2 Status of Warnings and Errors
 - CSV Export
 - Dummy Data creation

The screenshot displays the SPA Panel Software interface with the following sections:

- Airflow & Pressure:** A dual-axis line chart showing Airflow (Nm³/h) on the left y-axis (180-320) and Pressure (bar) on the right y-axis (5.0-6.0) over time. The x-axis shows dates from 05/25/19 to 06/03/19.
- Air Consumption:** A bar chart titled "Volume per hour for the last 7 days" showing hourly consumption in Nm³/h from 05/27 17:00 to 06/03 06:00.
- Summary Metrics:** A grid of summary cards for 24h, 7d, and 30d periods.

Volume	Costs	Energy	CO2
8207 m³	492.42 €	492 kWh	197 kg
53202 m³	3192.13 €	3192 kWh	1277 kg
19484 m³	1169.06 €	1169 kWh	468 kg
21351 m³	1281.08 €	1281 kWh	512 kg
- Statistics:** Three tables for Airflow, Pressure, and Temperature statistics.

Airflow Statistics [Nm³/h]				Pressure Statistics [bar]				Temperature Statistics [°C]			
Reset Time	Min	Mean	Max	Reset Time	Min	Mean	Max	Reset Time	Min	Mean	Max
2020-06-03 10:28:25	16.0	288.2	338.9	2020-06-03 10:28:25	1.8	4.4	7.7	2020-06-03 10:28:25	14.7	18.7	28.3
2020-06-03 10:27:25	17.6	206.8	409.9	2020-06-03 10:27:25	1.8	5.1	7.8	2020-06-03 10:27:25	10.2	19.9	26.4
2020-06-03 10:26:25	18.6	214.5	467.7	2020-06-03 10:26:25	1.4	9.2	7.1	2020-06-03 10:26:25	13.5	18.4	23.6
2020-06-03 10:25:25	8.9	311.9	481.4	2020-06-03 10:25:25	1.4	4.5	7.9	2020-06-03 10:25:25	13.8	18.6	28.8
2020-06-03 10:24:25	5.0	256.9	416.5	2020-06-03 10:24:25	1.2	5.4	7.9	2020-06-03 10:24:25	12.6	17.5	20.3
- Statistic Reset:** A section with a "Reset Now" button and a "Reset Interval" dropdown set to "1x per day".
- Status:** A table of events.

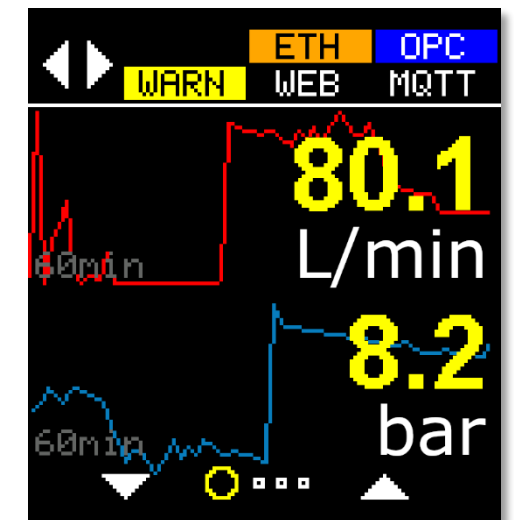
Name	Value
Event 1	VNC Service active
Event 2	Demo Mode active
Event 3	No MQTT Connection
Event 4	
Event 5	
Event 6	
- Config:** Configuration fields for Sensor IP (192.168.0.10), OPC UA Port (4840), and buttons for "Reset Database" and "Create Dummy Data".
- Tools:** A CSV Converter tool with fields for "CSV File to convert", "Delimiter", and "Decimal separator".

AVENTICS AF2 Flow Sensor Overview

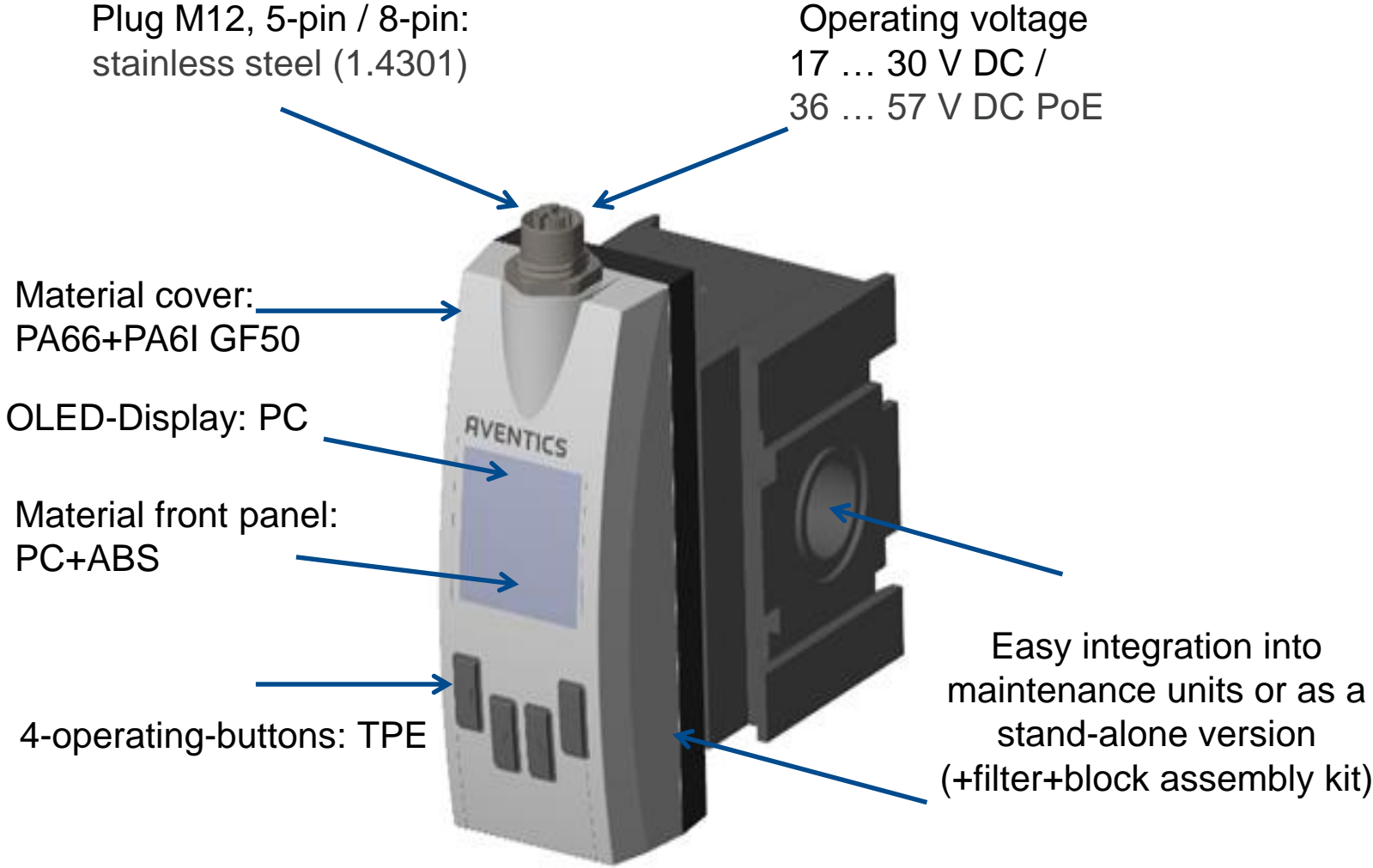
	Industrial	Ethernet	
Protocols	IO-Link, Analog	OPC UA, MQTT	
Features	OLED Display	OLED Display, Web Dashboard	
Size Variants		<u>Qmin</u>	
	AS2	5 l/min	<u>Qmax</u>
	AS3	8 l/min	1.590 l/min
	AS5	22 l/min	2.445 l/min
Process Parameters	<ul style="list-style-type: none"> • Volumetric Flow Rate (l/min) • Pressure (bar) • Temperature (C) • Mass Flow Rate (kg/h) 	<ul style="list-style-type: none"> • Flow velocity (m/s) • Volume (L) • Mass (kg) • Energy (kWh) 	
	Process Media	Compressed Air, Argon (Ar), Nitrogen (N ₂), Helium (He), and Carbon Dioxide (CO ₂)	
Integrated Analysis	Statistics – Min, Max, Mean Counter – Volume, Mass, Energy Logging – 7d, 24h, 60m		



OLED Display with Configurable Values and Graphs



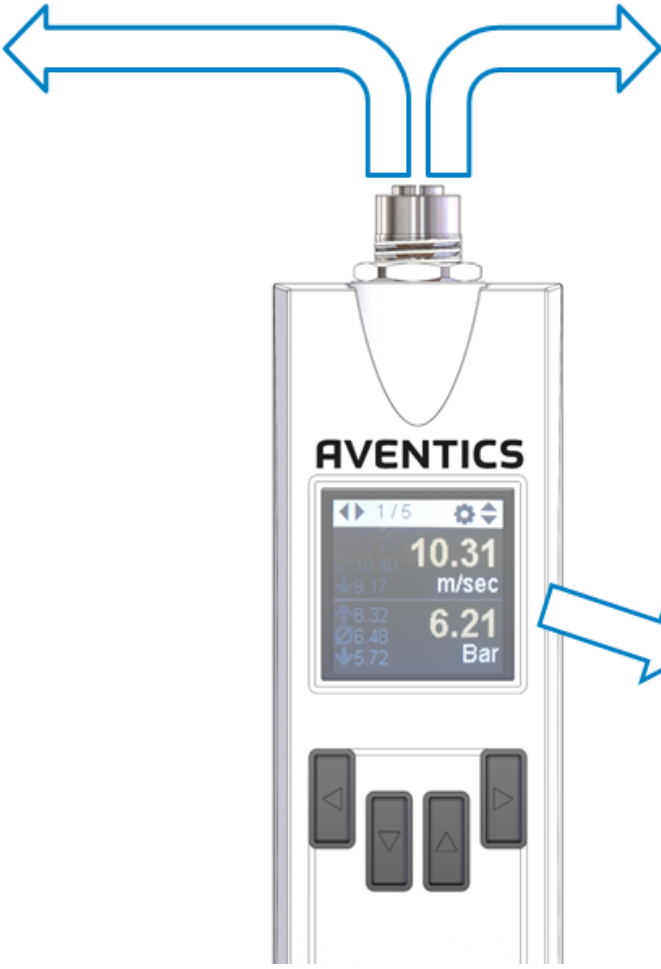
Overview



Protection class: IP65, IP67 (EN 60529)

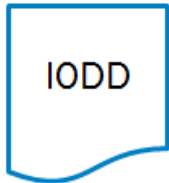
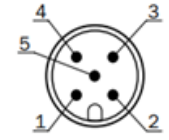
Ethernet Protokolle

- OPC UA
 - Name Space
- MQTT
 - User Manual
- HTTP
 - Website



Industrial

- Digital/Analog
- IO-Link



Display

- Menüführung
- User Manual

The sensor has either an Ethernet interface with the protocols **OPC UA, MQTT and HTTP** or a classic industrial interface with **IO-Link** as well as analog or digital outputs.

Both variants feature via a display for local parameterization on the sensor.

How to apply the SPA at a Customer

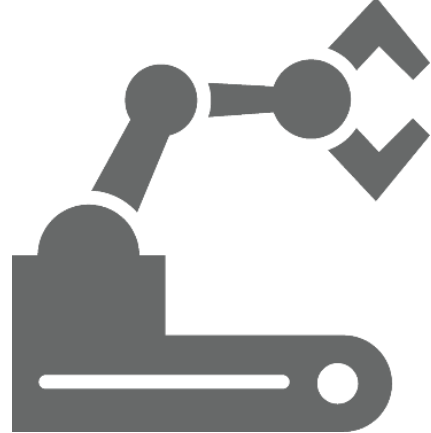
How to apply the SPA

Plant Air Supply



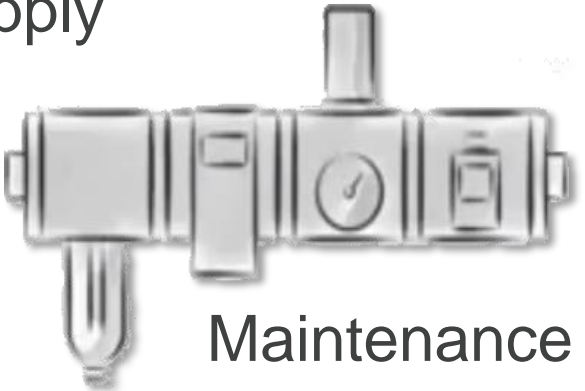
Maintenance Unit of Machine

SPA Panel



Machine

Plant Air Supply

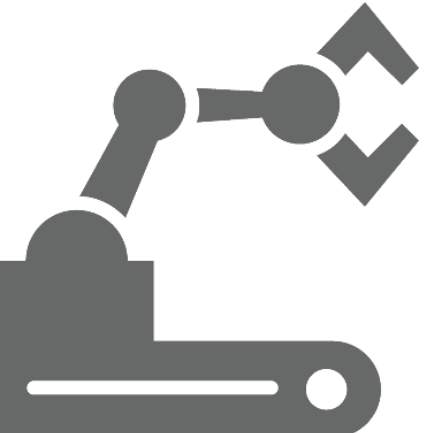


Maintenance Unit of Machine

Create Bypass for fast switch over
(Minimize Machine Downtime)



SPA Panel



Machine

The SPA Panel Software in details

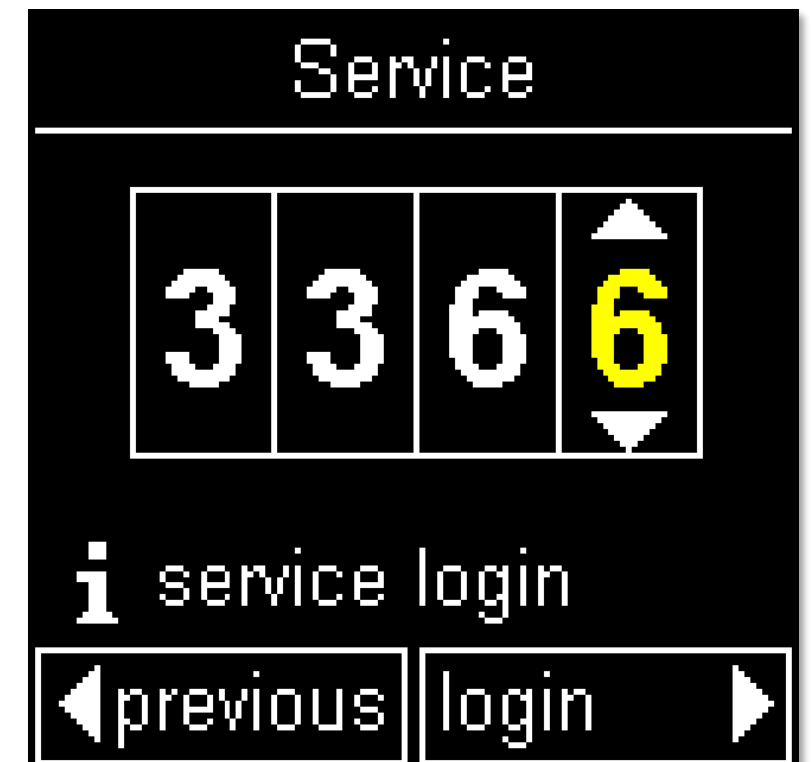
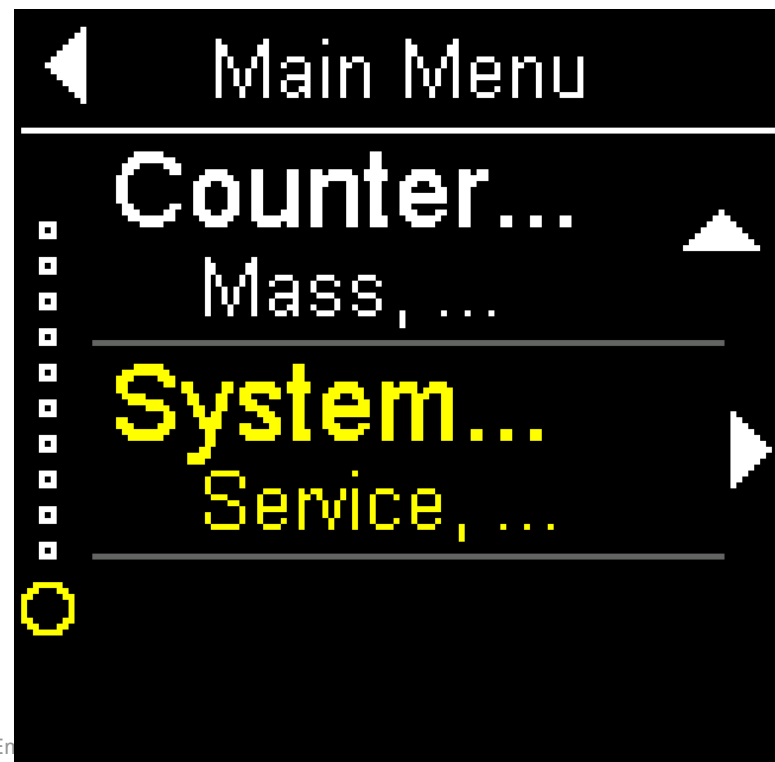
How to Start

1. Extract the ZIP file on the Windows Computer
2. Go in into the folder das start the “SPA-Panel.exe” file
3. On the first start the Software EULA needs to be accepted
4. In the upcoming Window the Connection to the SPA needs to be setup. Go to the Config Section and enter the IP-Address [default: 192.168.0.10] of the AF2 sensor and the OPC UA Port [default: 4840]
5. Press the “Save”-Button in the Config Panel
6. Now new values should PopUp in the different Panels on the Dashboard
7. Optional: To have some historical data inside the different Panels press the “Create Dummy Data”-Button
8. Optional: The “Reset Database”-Button deletes all historical data inside the database

The screenshot displays two side-by-side panels. The left panel, titled 'Config', contains two input fields: 'Sensor IP:' with the value '192.168.0.10' and 'OPC UA Port:' with the value '4840'. Below these fields is a 'Save' button. The right panel, titled 'Database', contains two buttons: 'Reset Database' and 'Create Dummy Data'.

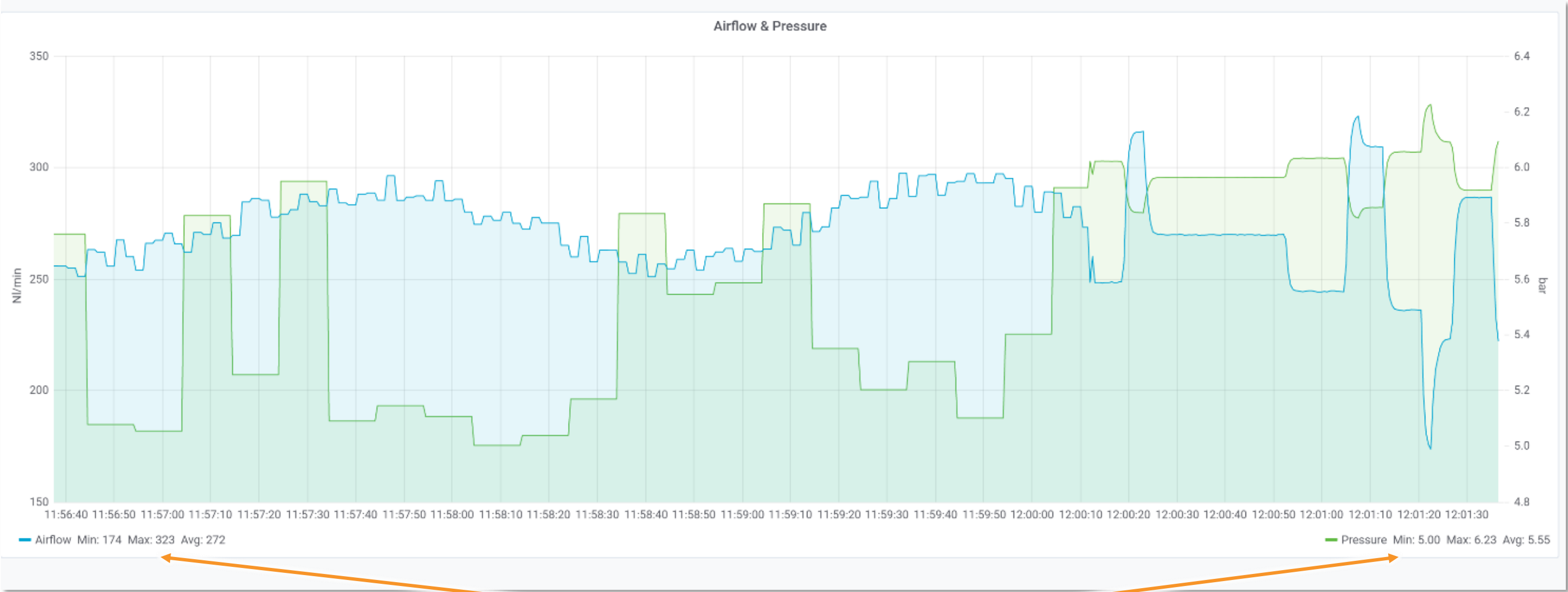
Optional: AF2 Demo Mode

- The AF2 Sensor can create Dummy Data, which could be activated via a Service Code
 - The Demo Mode shouldn't be activated during real measurements
1. Open the Main Menu at the AF2 by holding one of the Buttons
 2. Go to System → Service → Enter 3366 → Press the right Button to Login
Remark: On newer AF2 Sensors the Service Code 1000 need to be entered first before the Demo Mode could be activated
 3. If the Demo Mode is activated and random values appear on the Display



SPA Panel Software – Airflow & Pressure Chart

Time window → ↻ 2s ← Graph update Interval



Statistics based on the time window

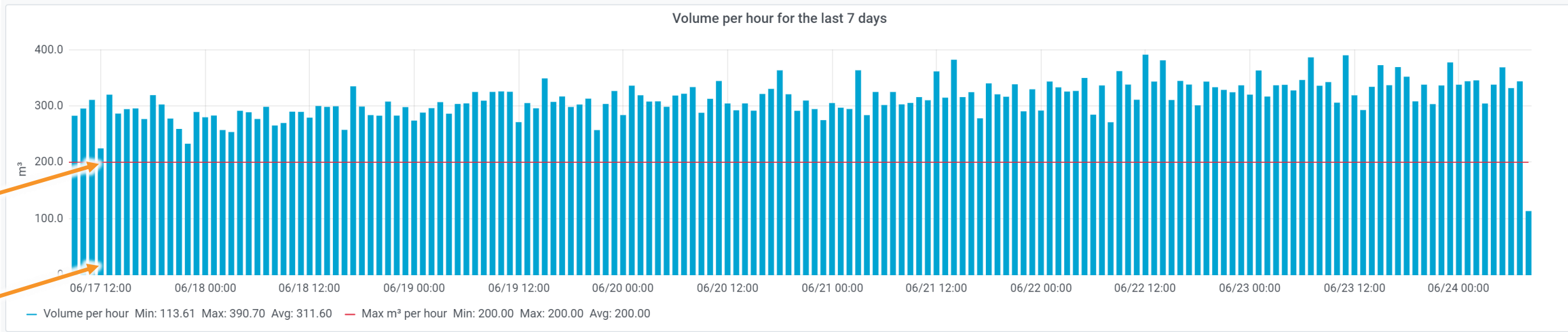
SPA Panel Software – Air Consumption & Leakages

Currency: € ▾
 Air Costs per m³: 0.06 ▾
 Max m³ per hour: 200
 Energy per m³ [kWh/m³]: 0.06
 CO2 per Energy [kg/kWh]: 0.4

Choose values for the different variables based on the customer environment

Red line represents limit of Air per hour

Each bar represents one hour



Calculation based on chosen variables

Volume includes overall Air Consumption

Leakage represents everything above the max value per hour

Volume last 24h	Costs last 24h	Energy last 24h	CO2 last 24h
8108 m³	486.45 €	486 kWh	195 kg
Volume last 7d	Costs last 7d	Energy last 7d	CO2 last 7d
52660 m³	3159.63 €	3160 kWh	1264 kg
Leakage Volume last 7d	Leakage Costs last 7d	Leakage Energy last 7d	Leakage CO2 last 7d
18947 m³	1136.81 €	1137 kWh	455 kg
Leakage Volume last 30d	Leakage Costs last 30d	Leakage Energy last 30d	Leakage CO2 last 30d
20987 m³	1259.19 €	1259 kWh	504 kg

SPA Panel Software – Sensor Statistics

Number of Statistic Rows

Variable Value to choose how many rows are shown in the Statistical tables

Statistics

Airflow Statistics [NI/min]				Pressure Statistics [bar]				Temperature Statistics [°C]			
Reset Time ▼	Min	Mean	Max	Reset Time ▼	Min	Mean	Max	Reset Time ▼	Min	Mean	Max
2020-05-08 12:00:12	12.8	243.8	494.0	2020-05-08 12:00:12	2.0	4.9	6.8	2020-05-08 12:00:12	10.3	17.7	20.6
2020-05-08 11:59:12	18.4	301.9	356.2	2020-05-08 11:59:12	1.5	4.7	7.7	2020-05-08 11:59:12	10.4	18.9	26.6
2020-05-08 11:58:12	28.2	189.4	426.7	2020-05-08 11:58:12	1.6	5.4	6.7	2020-05-08 11:58:12	11.0	18.9	24.7
2020-05-08 11:57:12	25.4	183.7	388.2	2020-05-08 11:57:12	1.3	5.2	7.5	2020-05-08 11:57:12	10.4	16.2	21.9
2020-05-08 11:56:12	4.5	265.2	420.2	2020-05-08 11:56:12	2.0	5.3	6.1	2020-05-08 11:56:12	13.3	15.2	23.3

Statistic Reset

Reset Interval:

Manual Reset of the integrated AF2 statistic. By pressing the button a row will be added in each table

Automatically Reset of the integrated AF2 statistics in an given interval, e.g. 1x per day or 1x per hour

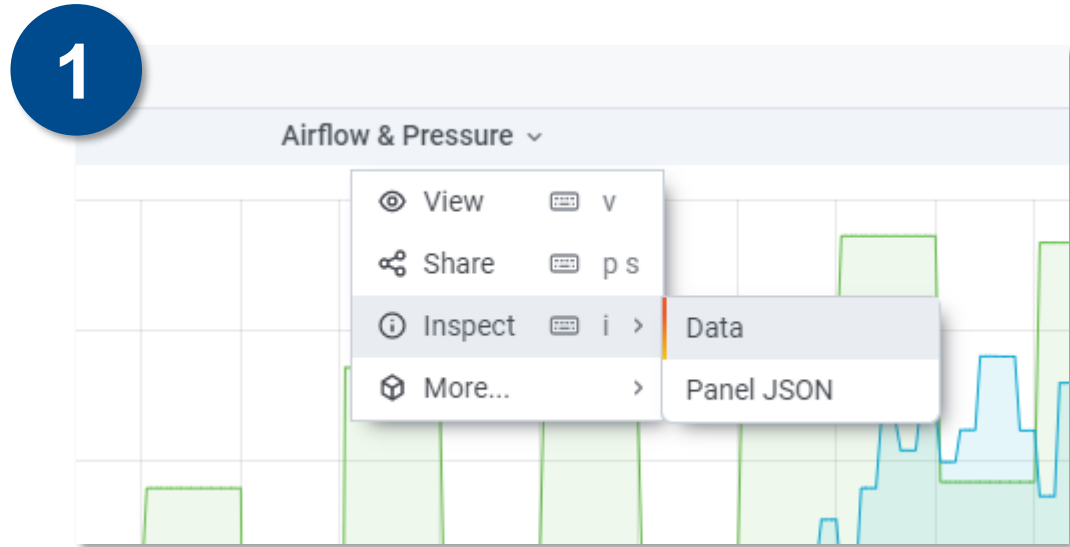
SPA Panel Software – AF2 Event Log

Events	
Name	Value
Event 1	VNC Service active
Event 2	Demo Mode active
Event 3	No MQTT Connection
Event 4	
Event 5	
Event 6	

Events that are present at the AF2 will be also visible in the Dashboard

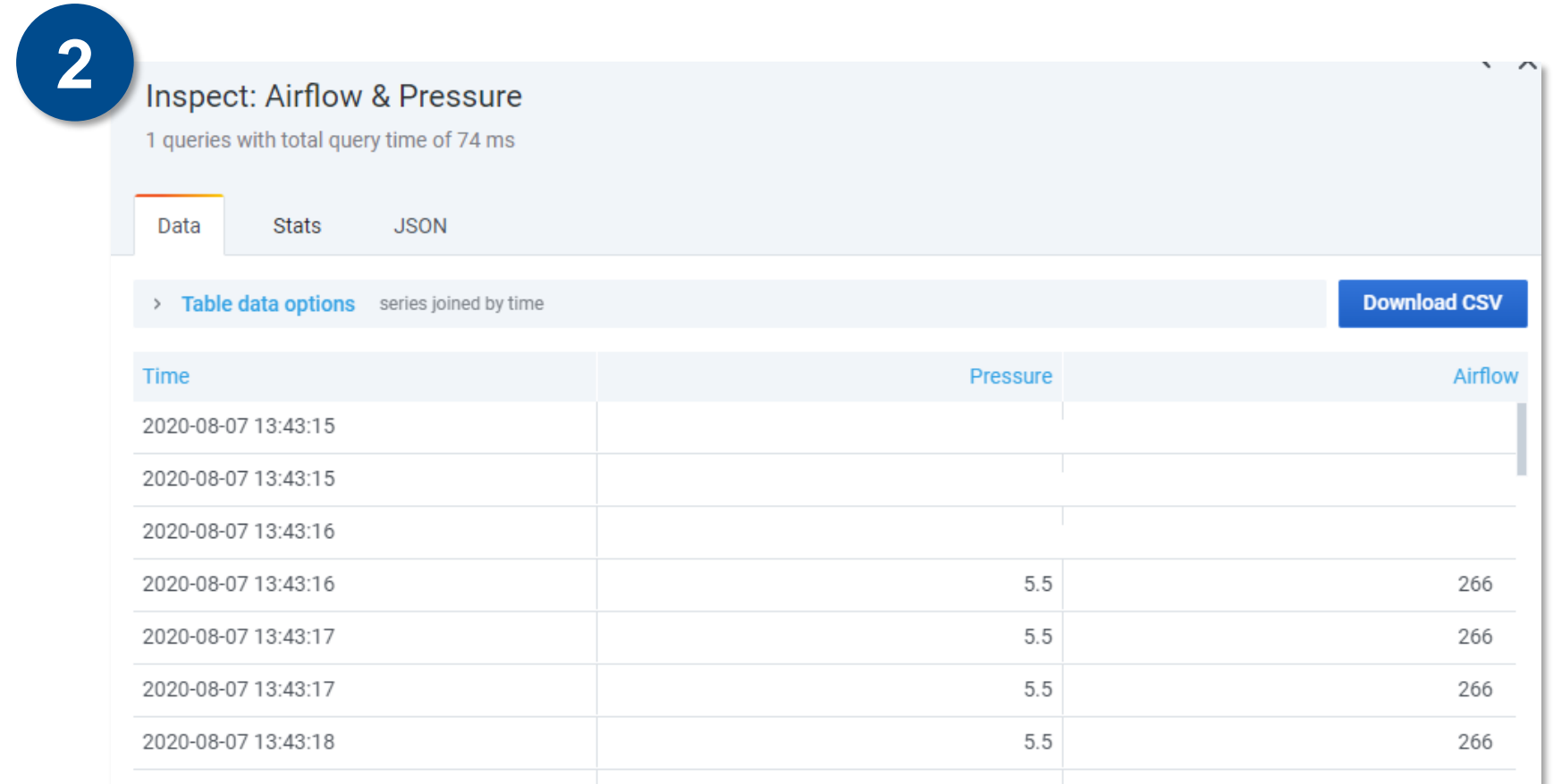


SPA Panel Software – CSV Export



Each Panel could be separately exported. The exported data will exactly represent what's visible in the chosen Panel.

1. Press on the headline of a Panel
2. Go to Inspect and Press on Data
3. A new overlay comes in from the right



The upcoming overlay shows the Data that will be exported.

1. Press the Download-Button
2. Choose a folder where the file should be stored in

SPA Panel Software – CSV Converter

- Different world regions use different decimal separators and delimiter inside CSV files
- Users which use the Dot as a decimal separator don't need to convert CSV files. Users which use the comma need to convert the file once before they use e.g. Excel to take a look into the data

Choose a file to convert



CSV File to convert:
 Keine ausgewählt

Choose the CSV Delimiter (Separator between values)



Delimiter (Default: ";"):

Choose the local decimal separator



Decimal separator (Default: ","):

Press Convert to save the new CSV file



AF2 Flow Sensor Competitor Comparison

Category		 AVENTICS	 FESTO	 SMC	 ifm
Series		AF2 – AS5	SFAM-62	PF2A703H	SD8500
Flow Range (1")	22 ... 6,490 l/min	50 ... 5,000 l/min	150 ... 3,000 l/min	14 ... 3,750 l/min	
Working Pressure	0 ... 16 bar	0 ... 16 bar	0 ... 15 bar	-1 ... 16 bar	
Media Temperature	-20°C ... +60°C	0°C ... +50°C	0°C ... +50°C	-10°C ... +60°C	
Mediums	Air, Ar, N2, He, CO2	Air, N2	Air, N2	Air, Ar, N2, CO2	
IP67 Protection Class	✓	✗	✗	✓	
I/O Link	✓	✗	✗	✓	
Ethernet (HTTP, OPC UA, MQTT)	✓	✗	✗	✗	
Data Logger	✓	✗	✗	✗	
Statistical Evaluation	✓	✗	✗	✗	
Simulation Function	✓	✗	✗	✗	

IIoT Features