

**Verbesserung der Nachhaltigkeit/Energieeffizienz
durch intelligente Pneumatik von Emerson (Aventics)**

**Improvement of sustainability/energy efficiency with
intelligent pneumatic from Emerson (Aventics).**

Dieter Michalkowski Global Account Management



Broad range of components offered within Industrial Pneumatics

Compressed air
preparation
and accessories



AS3 with AF1

Valves, valve
systems,
and fieldbus
applications



ED02



AV06

Cylinders and
sensors



RTC



PRA

Improvement of sustainability/energy efficiency so simple



Luftverbrauch Maschine.
Programminformation Version 1.4

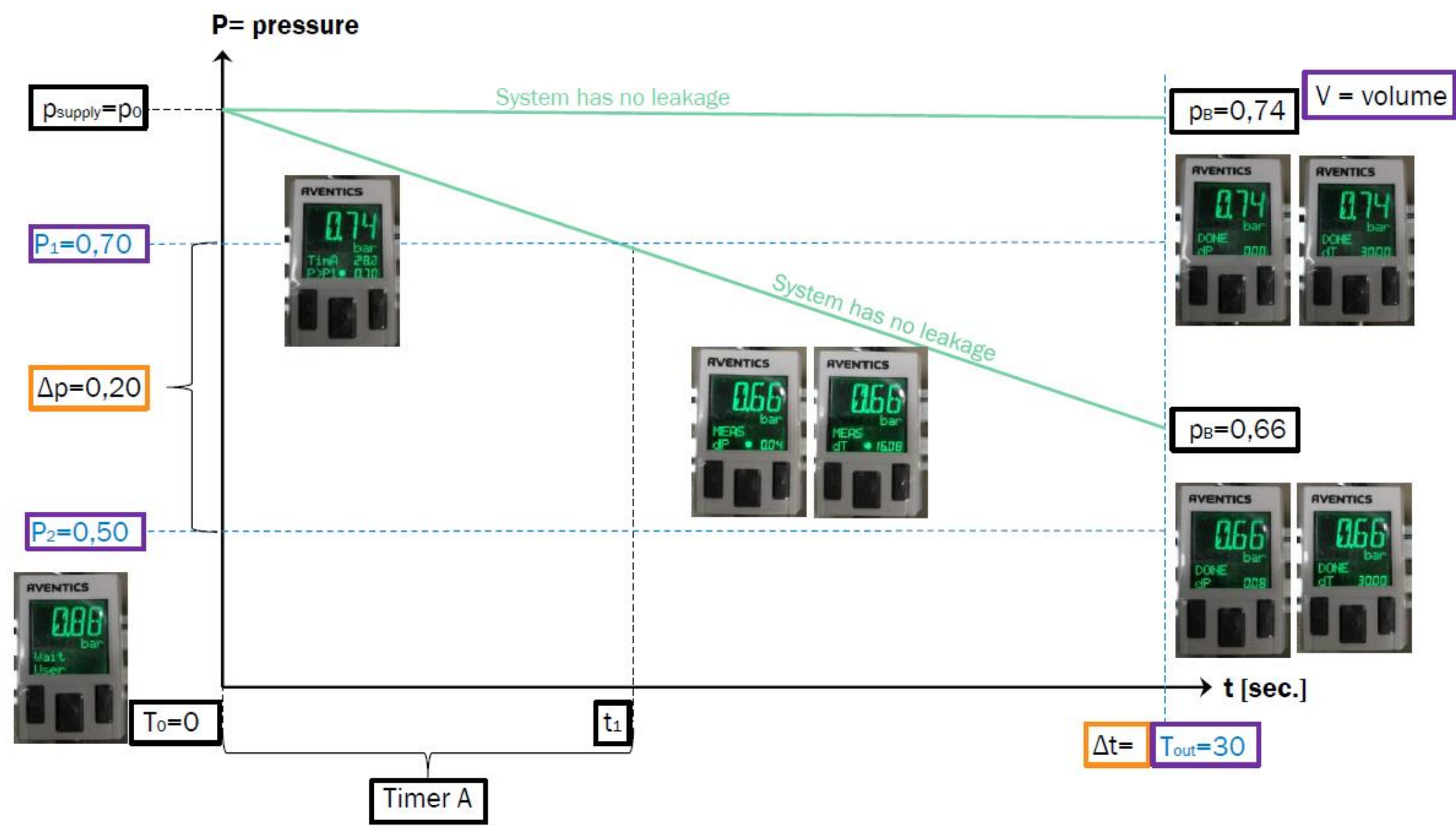
Thu Mar 28 08:27:04 CET 2019
Feld für Projektdaten

Betriebsstunden/Jahr: 4000
Energiekosten/kWh 0.1 (EUR)
Kompressordaten:
Spezifische Energie kW/(NI/s) 0.4

Eingabe:										Ergebnis:
Beschreibung:	Anzahl Zylinder:	Zylinder Typ:	Durchmesser Zylinder:	Hub (mm):	Versorgungsdruck P1(bar):	Versorgungsdruk ruck Rückhub P2(bar):	Frequenz (c/min):	Innendurchmesser Schlauch (mm):	Schlauchlänge (m):	Luftverbrauch (NI/min):
A	1	Kolbenstangenzyylinder (doppeltwirkend)	32	200	5	4	1	8	1	2,18
B	1	Kolbenstangenzyylinder (doppeltwirkend)	25	200	5	4	1	8	1	1,50
A	1	Kolbenstangenzyylinder (doppeltwirkend)	32	200	5	3	1	8	1	2,00
B	1	Kolbenstangenzyylinder (doppeltwirkend)	25	200	5	3	1	8	1	1,38
A	1	Kolbenstangenzyylinder (doppeltwirkend)	32	200	5	5	1	8	1	2,37
B	1	Kolbenstangenzyylinder (doppeltwirkend)	25	200	5	5	1	6	1	1,37

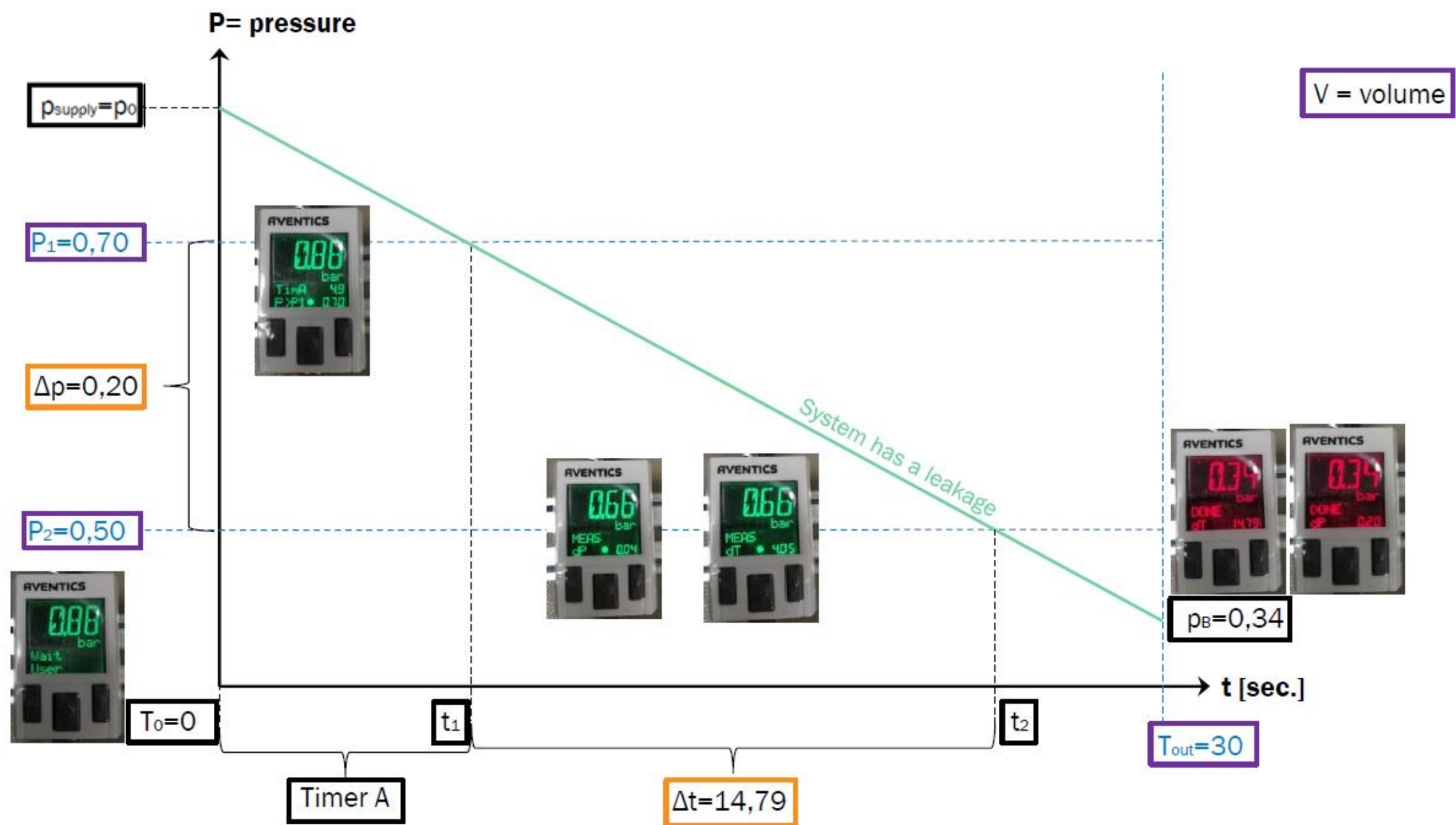
PE5 Leakage tester – Pressure drop test

Scenario A – system ok



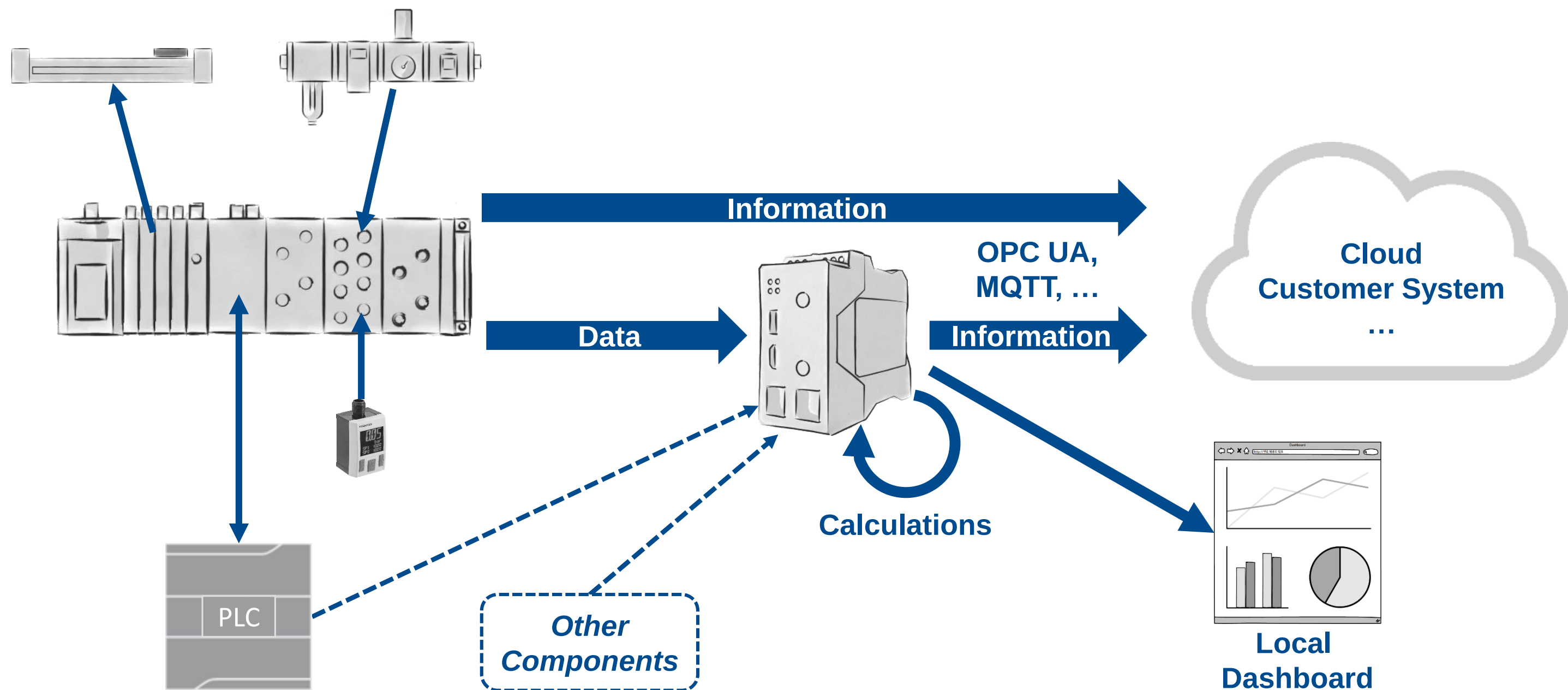
PE5 Leakage tester – Pressure drop test

Scenario B – system not ok

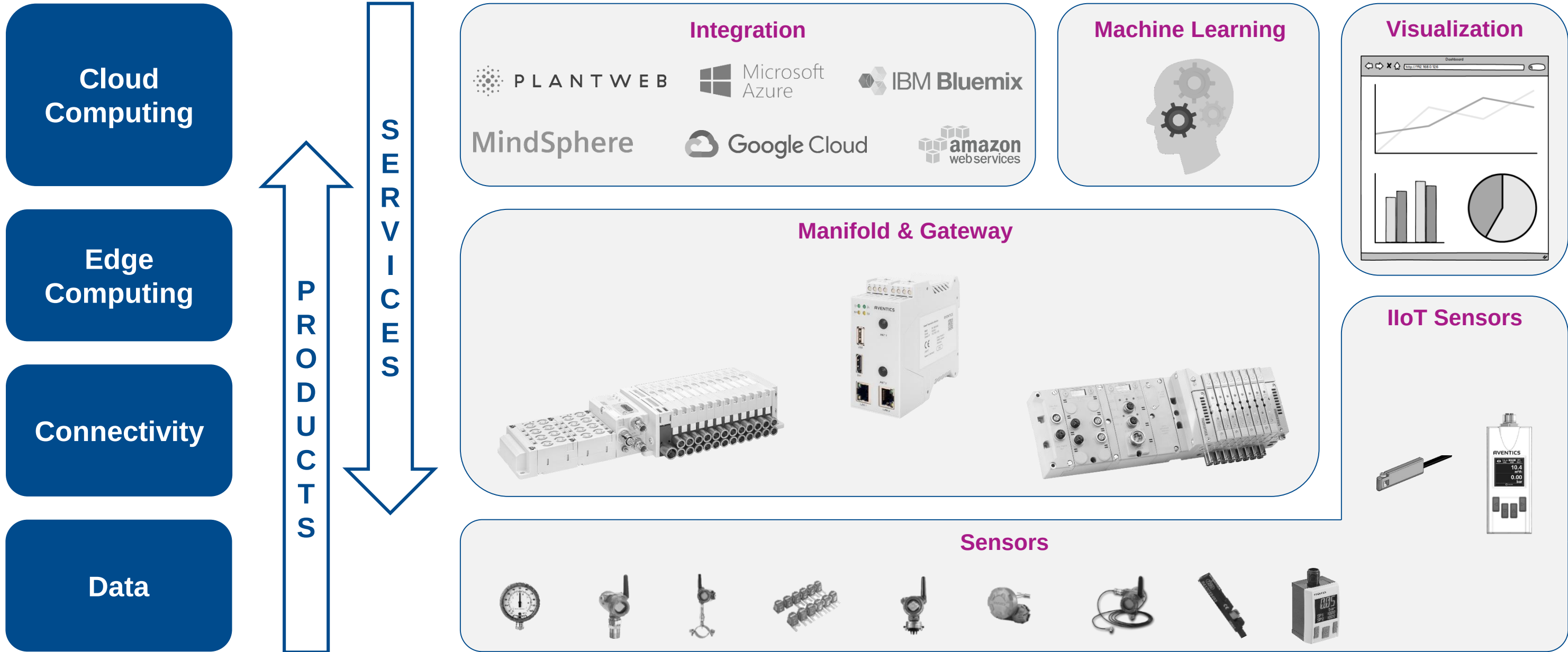


 = stored parameters = adjustable parameters = output value

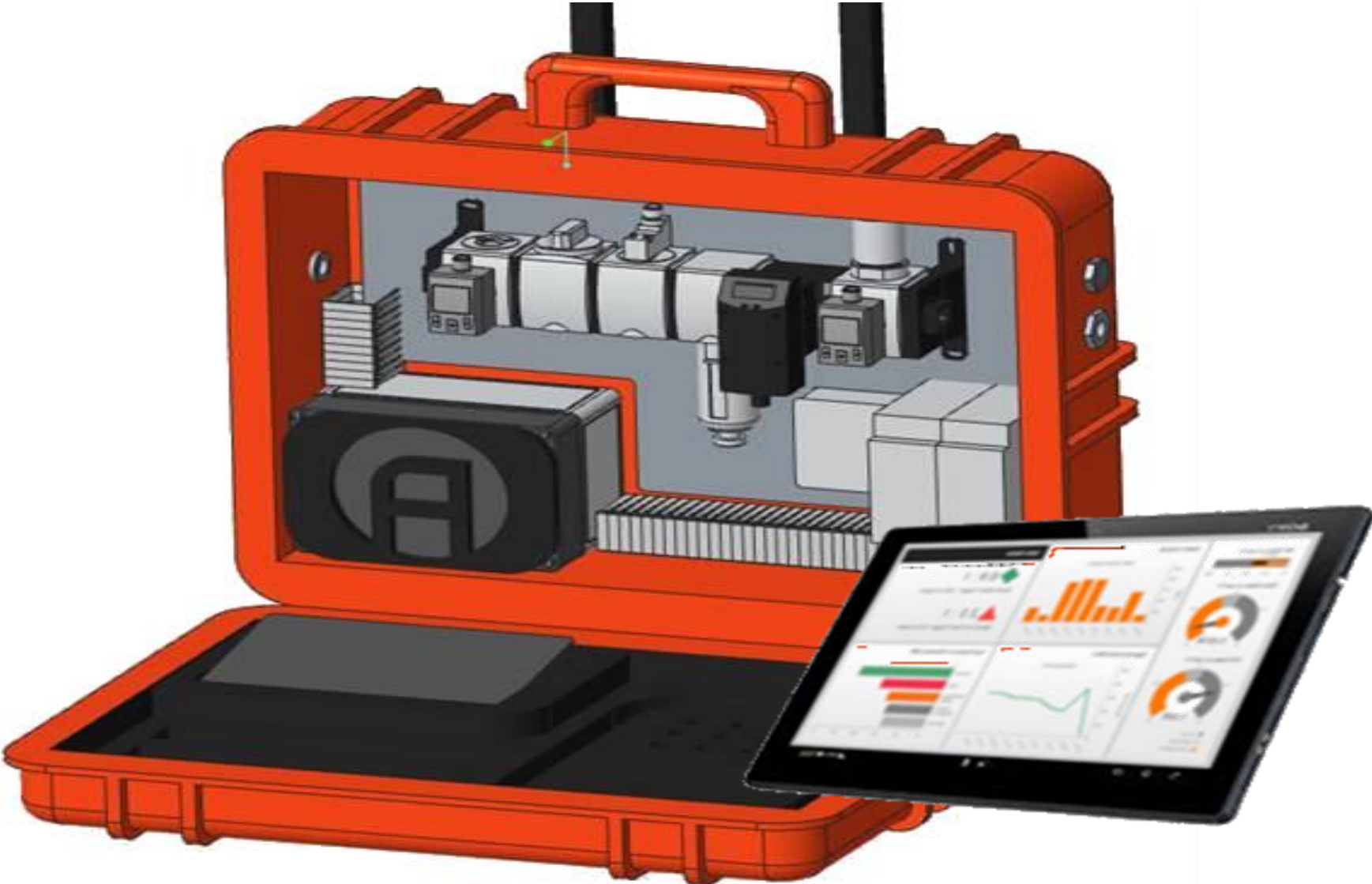
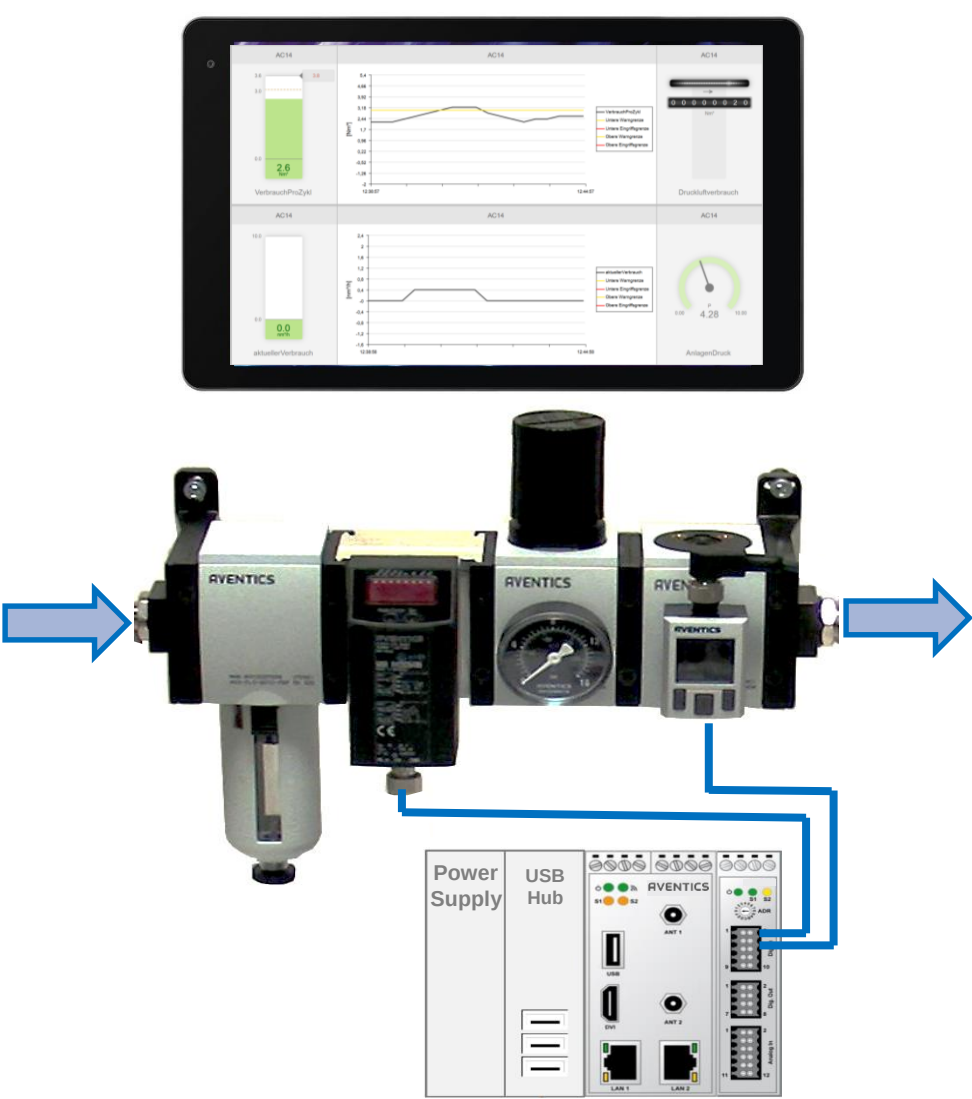
Intelligent Pneumatic



Intelligent Pneumatic with IIoT Ecosystem

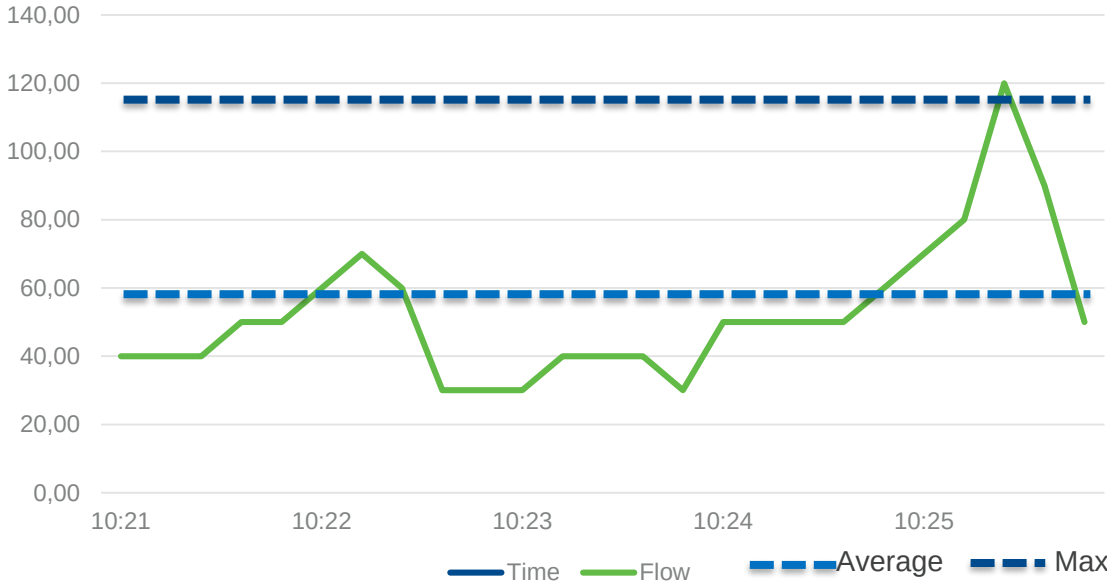


Intelligent Pneumatic in a box

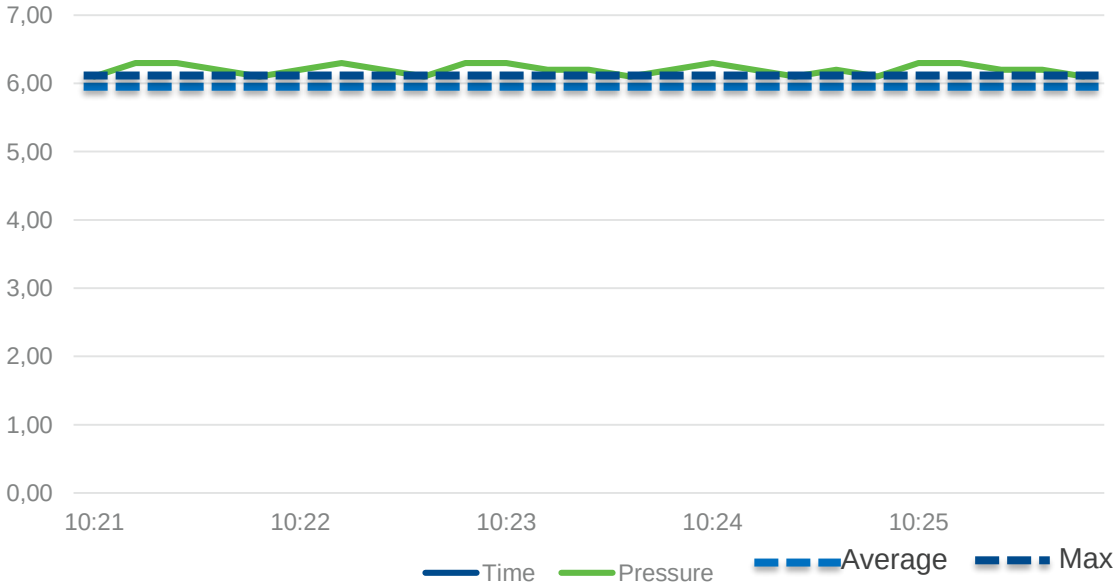


Intelligent Pneumatic in a box

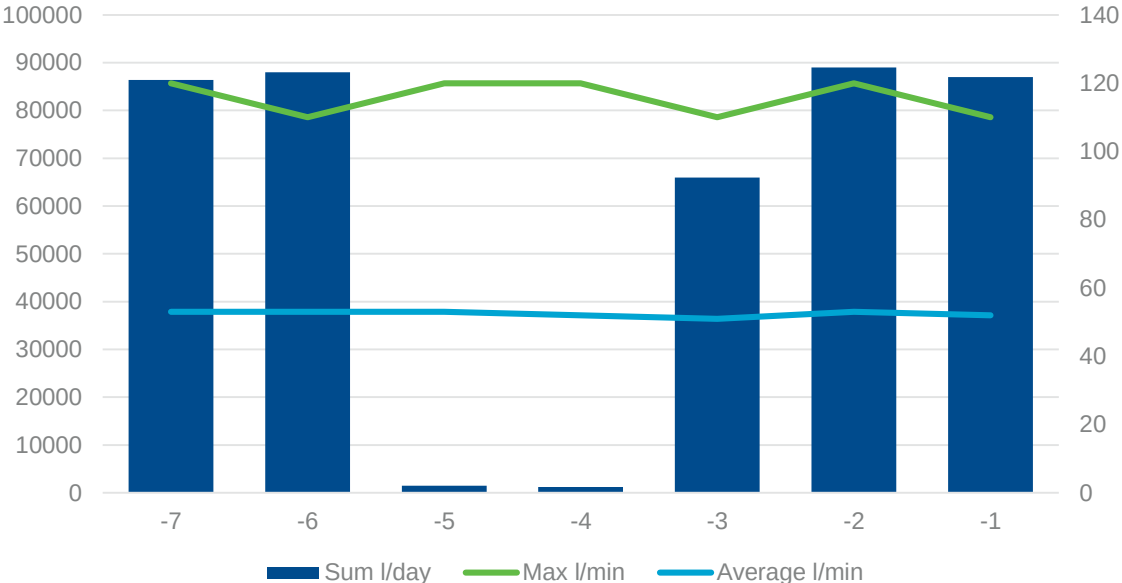
Air Consumption



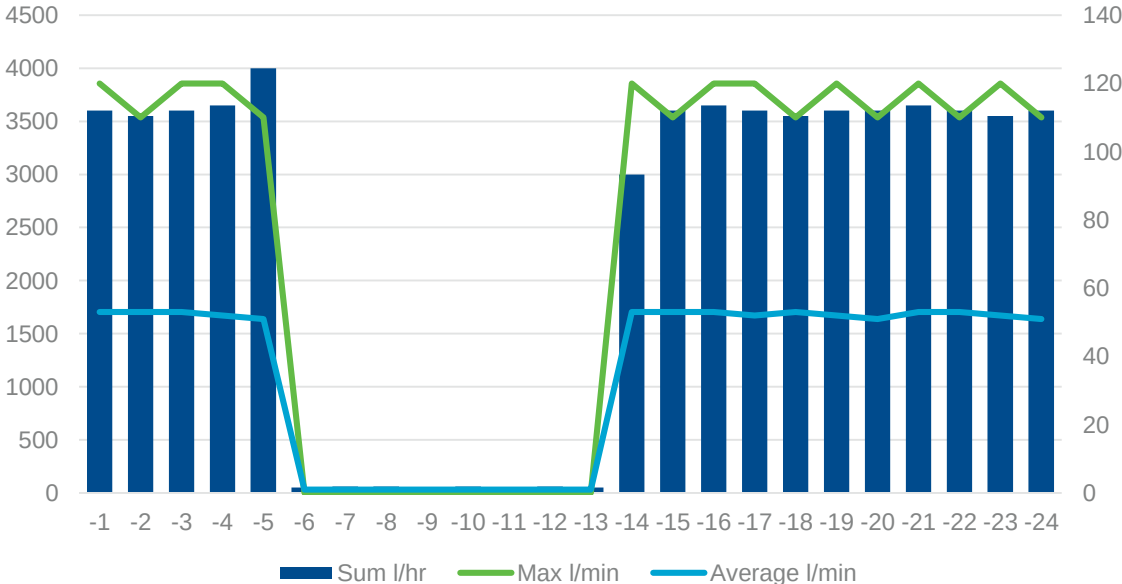
Air Pressure



Last 7 days

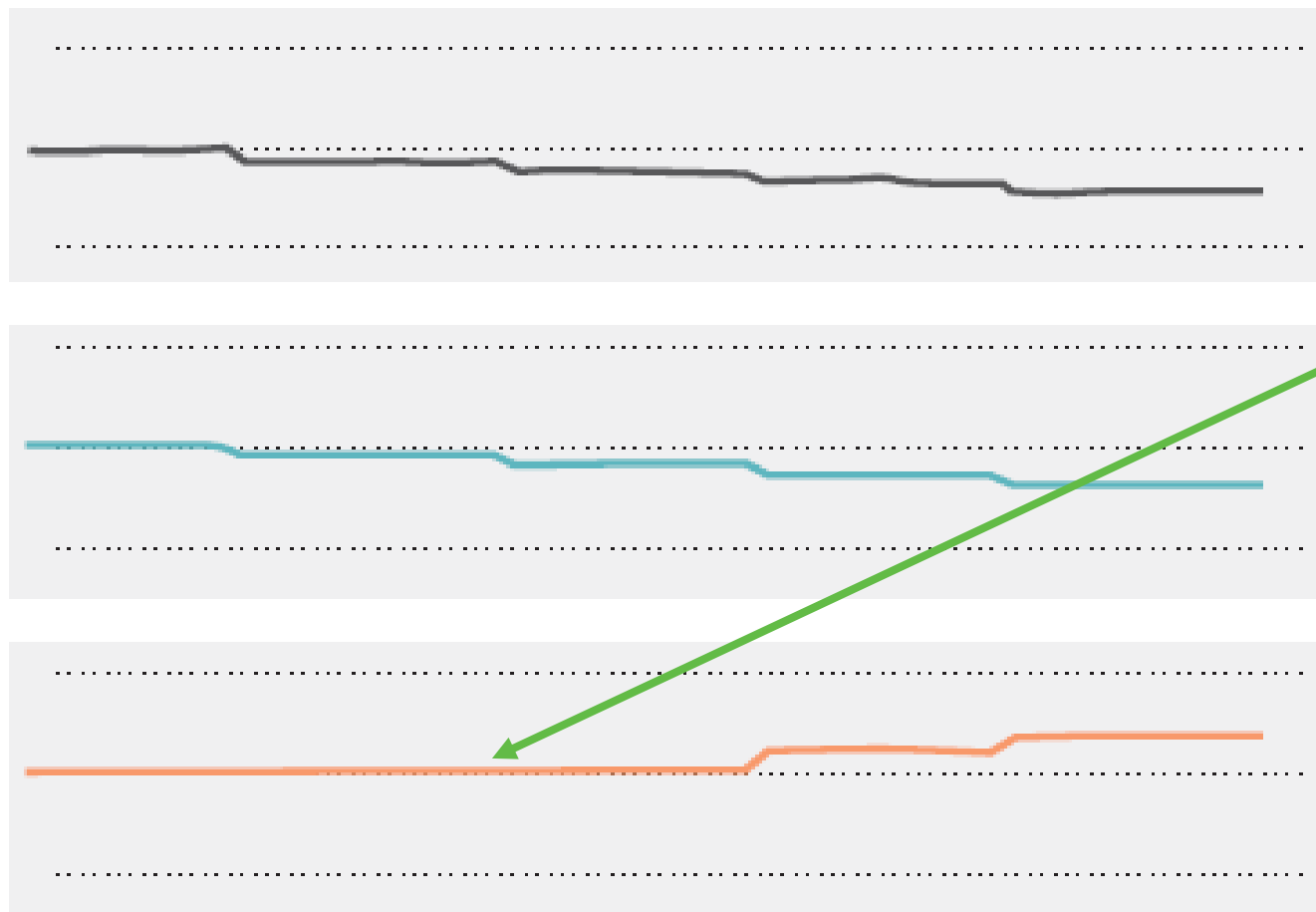


Last 24 Hours



Consumption Optimization

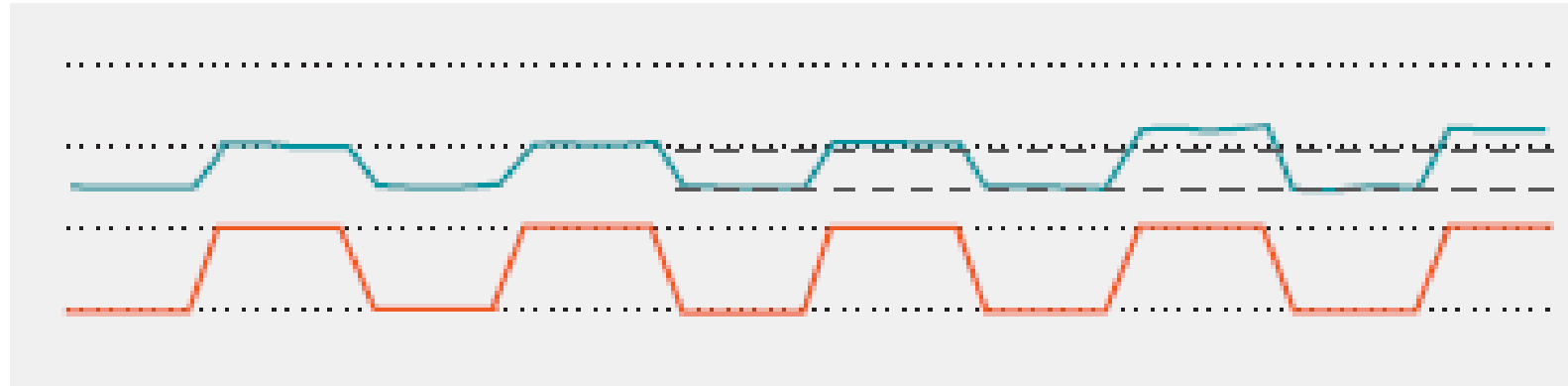
- Evaluating the effects reduction of working pressure to optimize energy consumption



Decreasing the pressure will also decrease the air consumption without reasonable effect on the cycle time

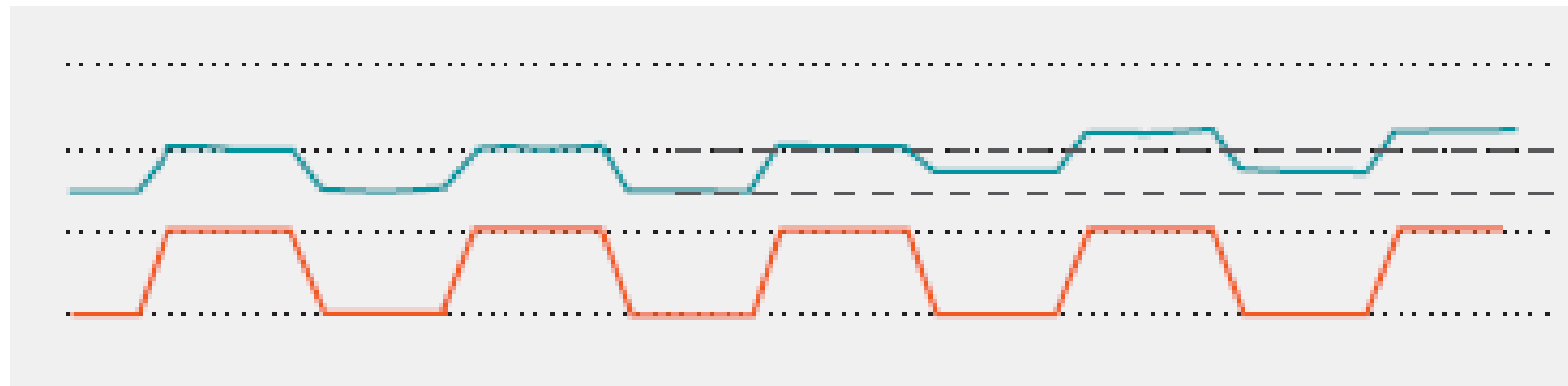
— Set pressure — Cycle time
— Compressed air consumption

Leakage Detection



Increase in consumption
when valve is on

→ Leakage at actuator

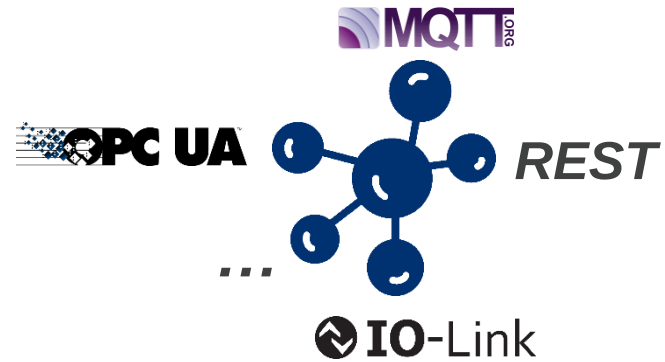


Increase in consumption
independent of valve status

→ Leakage before valve

— Flow
— Valve switching state

Intelligent Pneumatic as product IIoT Flow Sensor



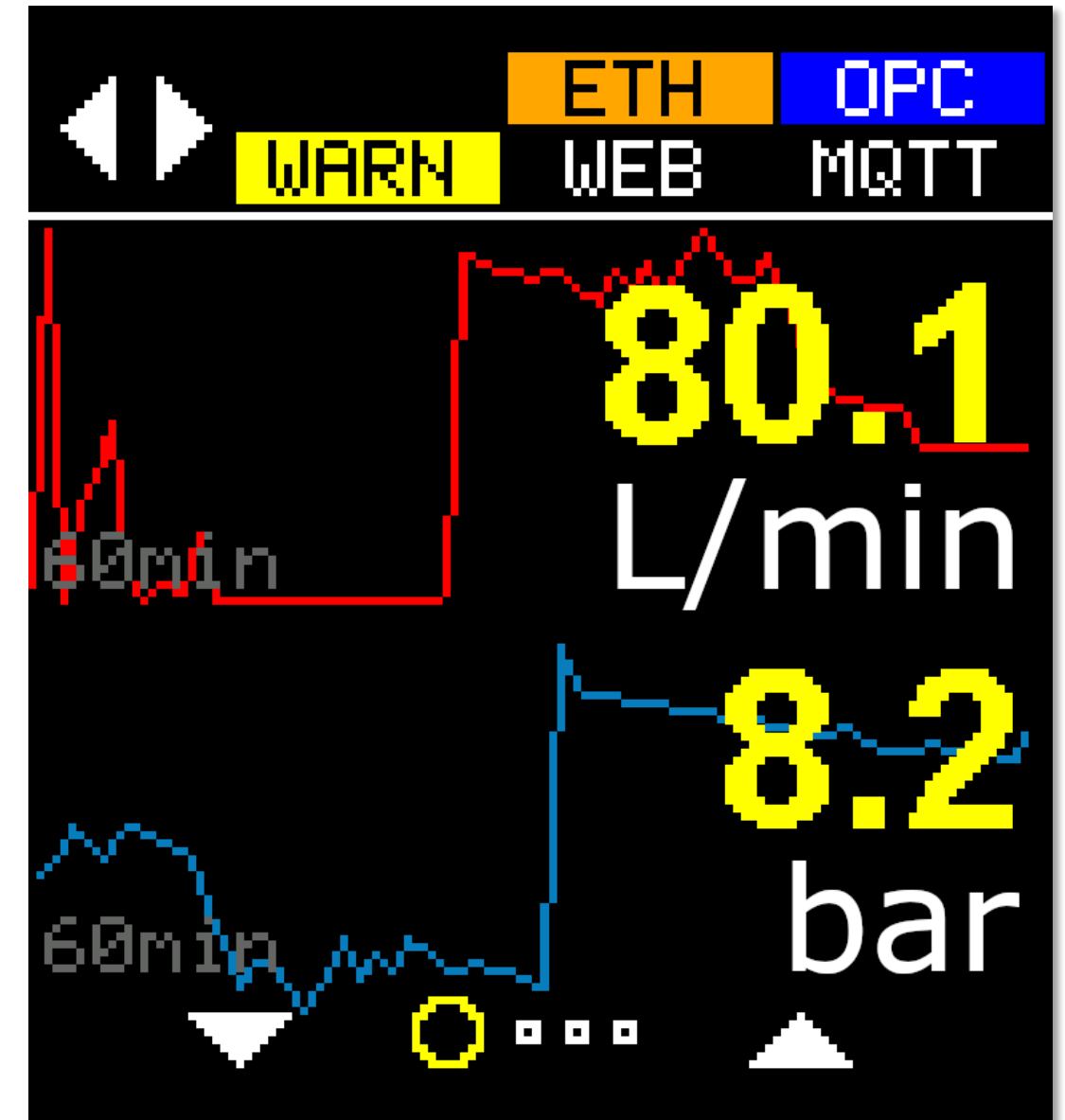
Airflow Sensor

- OPC UA
- MQTT
- REST
- IO-Link
- Logging
- Integrated value analysis



Intelligent Pneumatic as product IIoT Flow Sensor

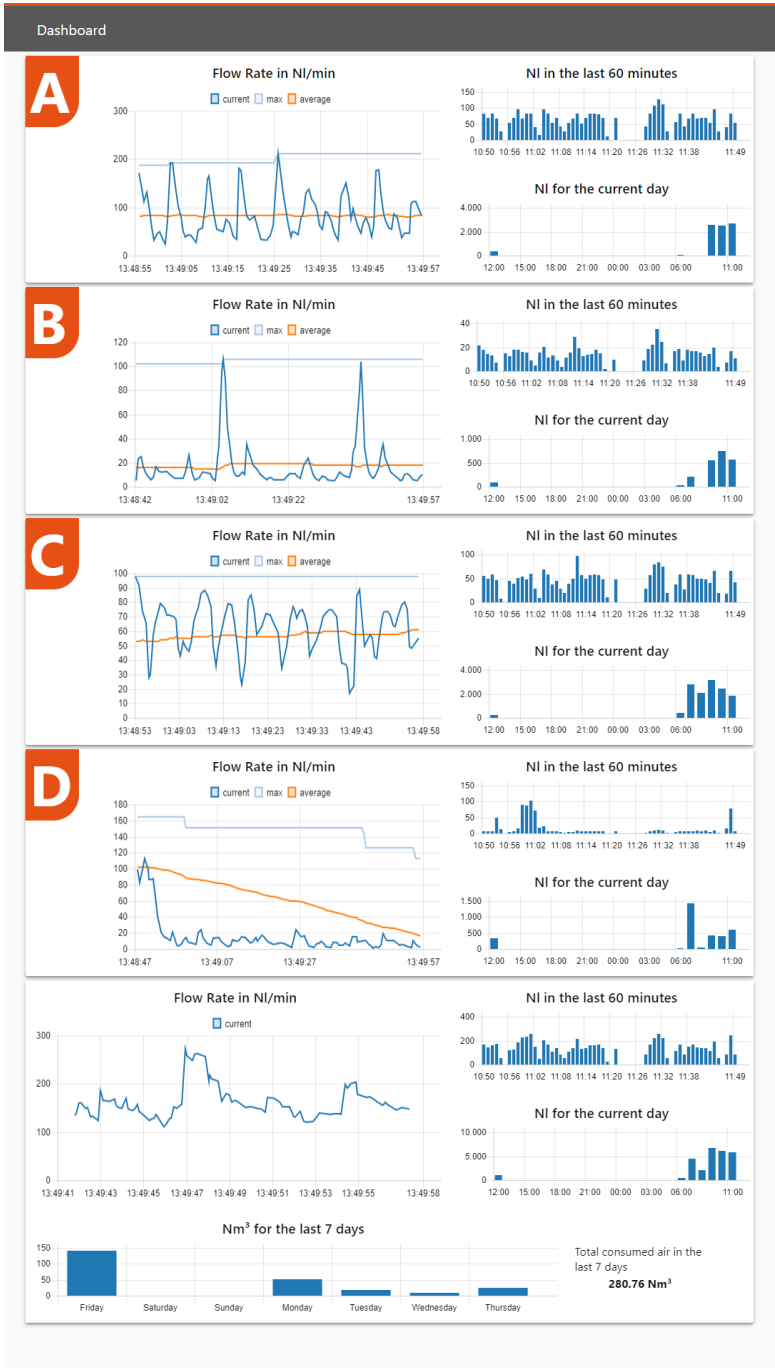
- Process parameter
 - Volumetric Flow Rate (L/min)
 - Pressure (bar)
 - Temperature (°C)
 - Mass Flow Rate (kg/h)
 - Flow Velocity (m/s)
 - Volume (L)
 - Mass (kg)
 - Energy (kWh)
- Integrated statistics (min, max and mean)
- Integrated counter (Volume, Mass, Energy)
- Integrated logging (7d, 24h, 60min) readable via OPC UA
- OLED Display with configurable values and graphs



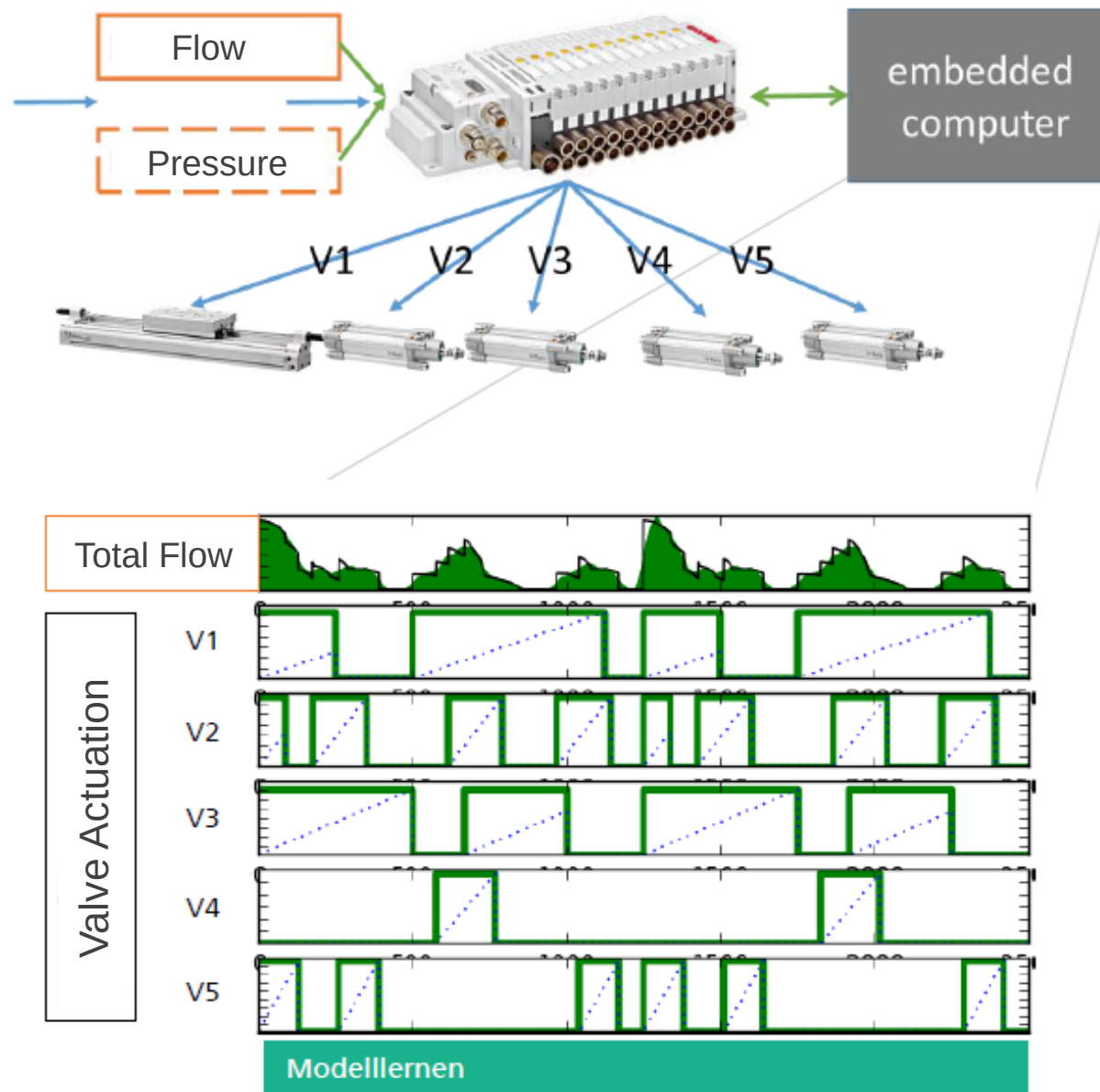
Integrated solution



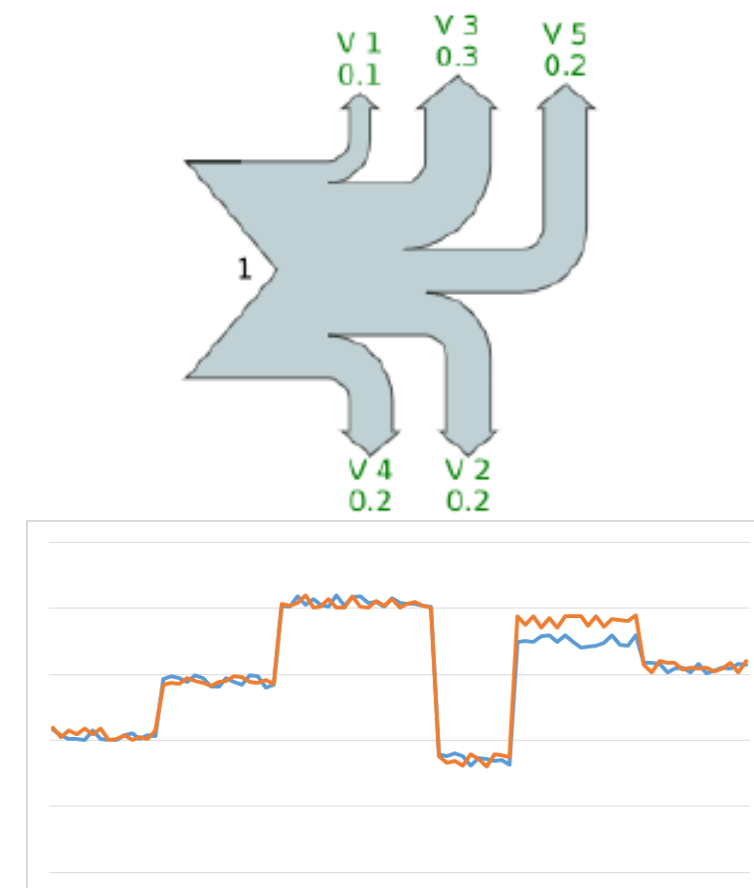
Integrated solution



Anomaly Detection



- Luftverbrauch je Funktion
- Anomalie / Leakage Detektion



Production Performance Management



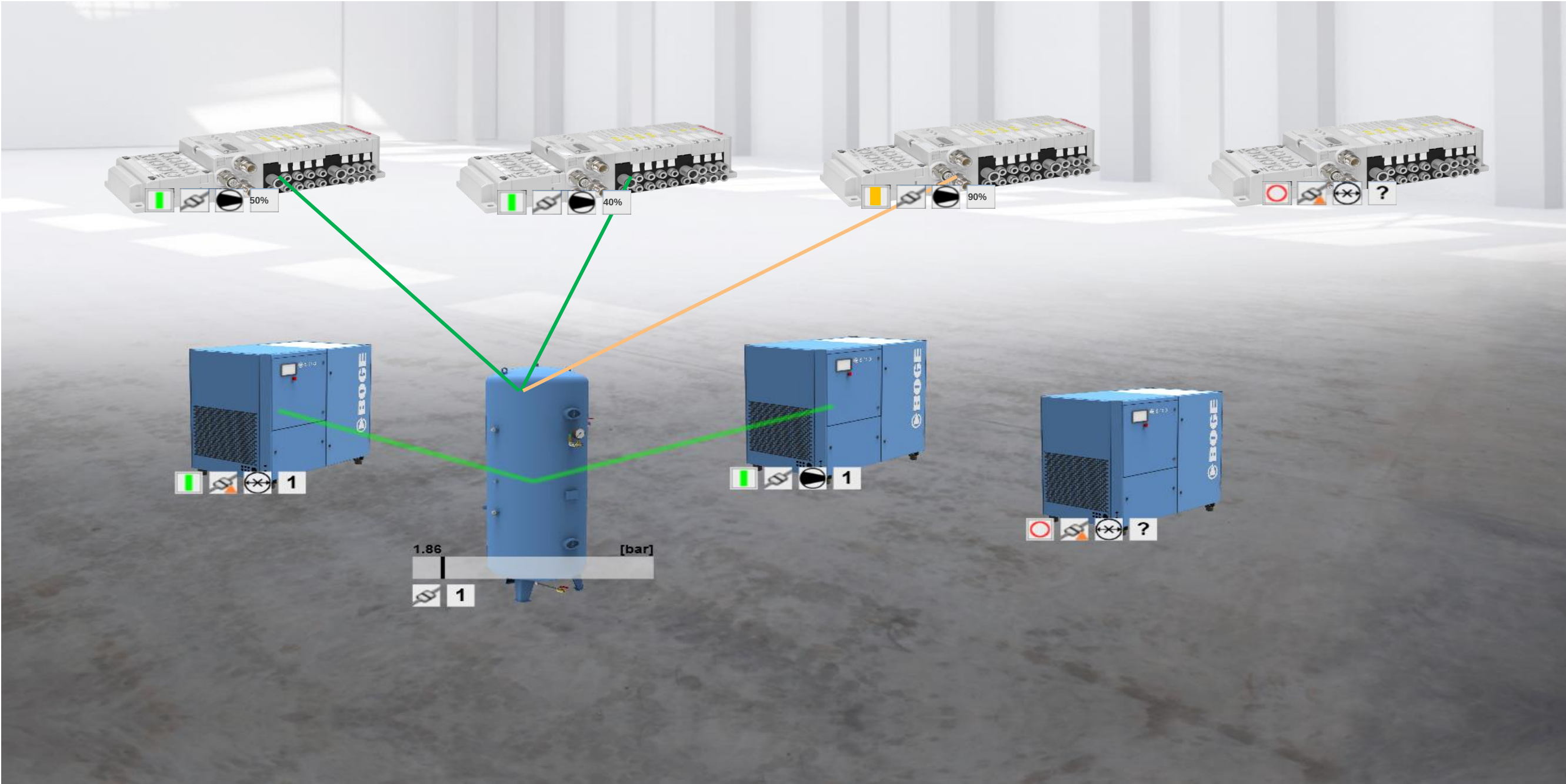
OPC-UA

OPC-UA

OPC-UA



“Smart Pneumatic Grid” with BOGE and Fraunhofer



Thank you very much!

Questions?

Dieter Michalkowski Global Account Management

