Differential pressure measurement in clean rooms

Pascal product line

**Highest accuracy for lowest differential pressures**

AGENDA

- ⭐ *Clean room facility design*

- ⭐ *Our solution - Pascal dP-transmitters*

- ⭐ *Pascal dP-transmitter for air velocity measurement*

- ⭐ *The new CALIBOX „dP-calibrator"*

- ⭐ *Conclusion*

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The Art of Precision Measurement

The good old days - clean room facility design - old fashioned, but still very spread

- ☒ **Long hose bundles from the clean rooms to Central panel with dP-instruments**
- ☒ **No instruments on point of action inside the clean rooms**
- ☒ **Only for static dP measurement instruments (no influence by hose length)**

Hose bundles

Central control panel with dP-instruments

Clean Room facility
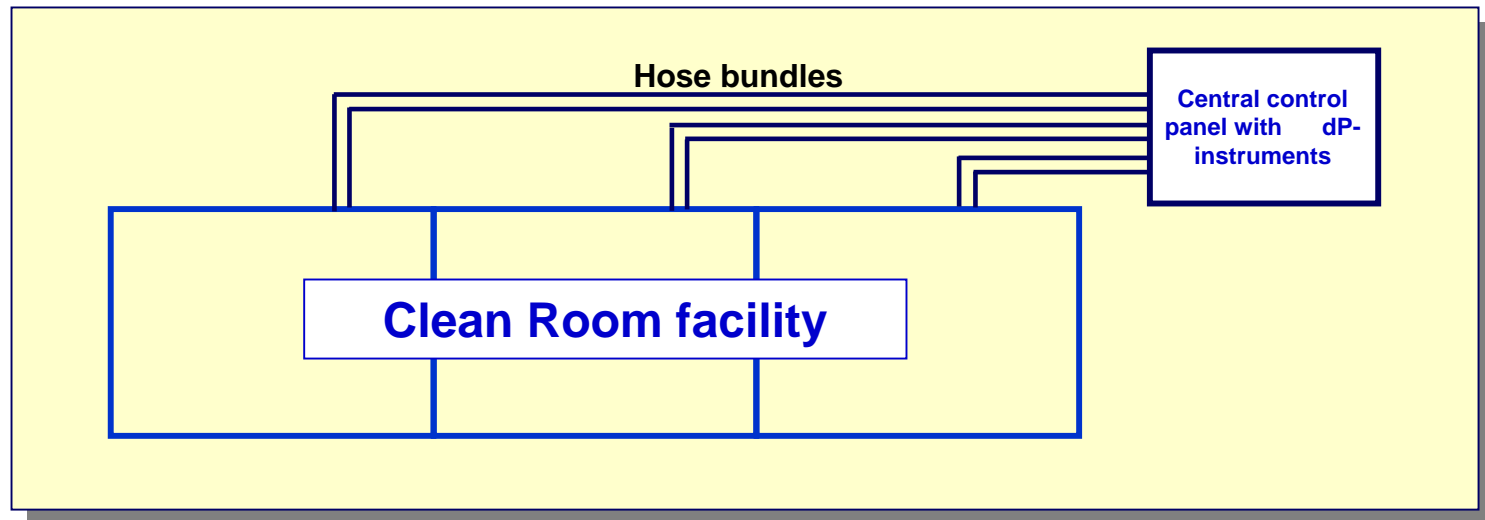
Disadvantages

- ☒ **During calibration you have always the hose as unknown factors**
- ☒ **No accurate calibration there where you have to measure, inside the clean rooms**
- ☒ **Rubber hoses become stiff and cracked after a certain time**
- ☒ **Expensive installation of hoses**
- ☒ **Unnecessary redundancies as normally the monitoring system shows the values per clean room**

Pascal dP-transmitters / Calibox mobile dP-calibrator

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The Art of Precision Measurement

The future - state of the art design in clean room facility management

- ⊠ **No hose bundles but just electrical wiring for analogue or digital signals to PLC/monitoring system**
- ⊠ **dP instruments installed on the point of action, directly inside or outside the clean rooms**

Wiring / analogue or digital signals

PLC monitoring system

Clean Room facility
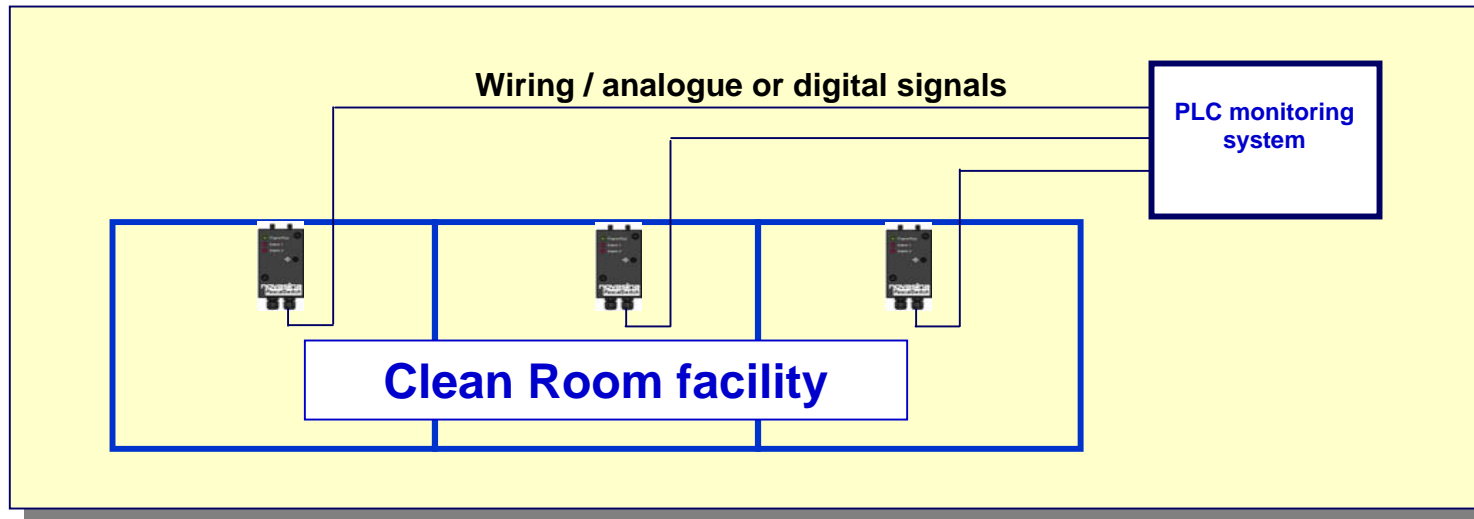
Advantages

- ⊠ **High accuracy thanks to an innovative measurement and data transfer technology**
- ⊠ **Stable measurement technology that does not require any additional calibration cycles**
- ⊠ **Easy and cost efficient installation (just electrical wiring to PLC system)**
- ⊠ **Easy to operate configuration software (for Palm and PC)**

Pascal dP-transmitters / Calibox mobile dP-calibrator

There is no good reason to not install mass flow dP transmitters in clean rooms

Not founded arguments to not use mass flow dP transmitters:	*Novasina disprove such arguments based on real facts:*
✪ **Leakage due to mass flow measurement principle**	✪ **This is a fact, but the mass flow is neglect able, max. 0.37 litre/min. at 100 Pa.** ✪ **Every door lock, door and window seal has more leakage**
✪ **Hose length is limited to 30 m**	✪ **Not necessary with new design, installation directly on clean room walls**
✪ **We worry about the leakage because of clean room and environmental contamination**	✪ **Clean rooms are always in over / under pressure as a 100% sealed room is not existing. Otherwise it would be meaningless to invest amounts of money in air treatment and ventilation**
✪ **During the calibration we have always to wear clean room dresses, pass the sluices and risk a contamination**	✪ **Novasina dP sensors do not have any mechanical parts. Thus no drift and hysteresis.** ✪ **Calibration frequency can be met as prescribed by the customer (e.g. once par year)** ✪ **Once a year you have anyway to get into the clean rooms for checking the whole system as airborne particles, FFU's, seals etc..**

Today Novasina dP transmitters respect the FDA recommendations on DQ, IQ, OQ, PQ.

Novasina assures a complete traceability of each component of its transmitters.

Our intelligent transmitter enables as well a protection by a access code.

Pascal dP transmitters
## The ideal solution for all requirements

- ☒ **PascalSwitch** for monitoring
- ☒ **PascalDat** for controlling
- ☒ **PascalVision** for controlling / visualisation

Main features:

➢ **Highest accuracy up to 0.05 Pa at dP < 3.4 Pa**

➢ **No drift → more than 2 years tested in house**

➢ **No hysteresis, indispensable for dP-controlling**

➢ **Very robust – 2 bar overpressure resistance**

➢ **Easy to calibrate with freeware from Novasina**

➢ **Analogue (voltage and current) + digital (RS 232) outputs as standard**

Technology for demanding applications

air duct

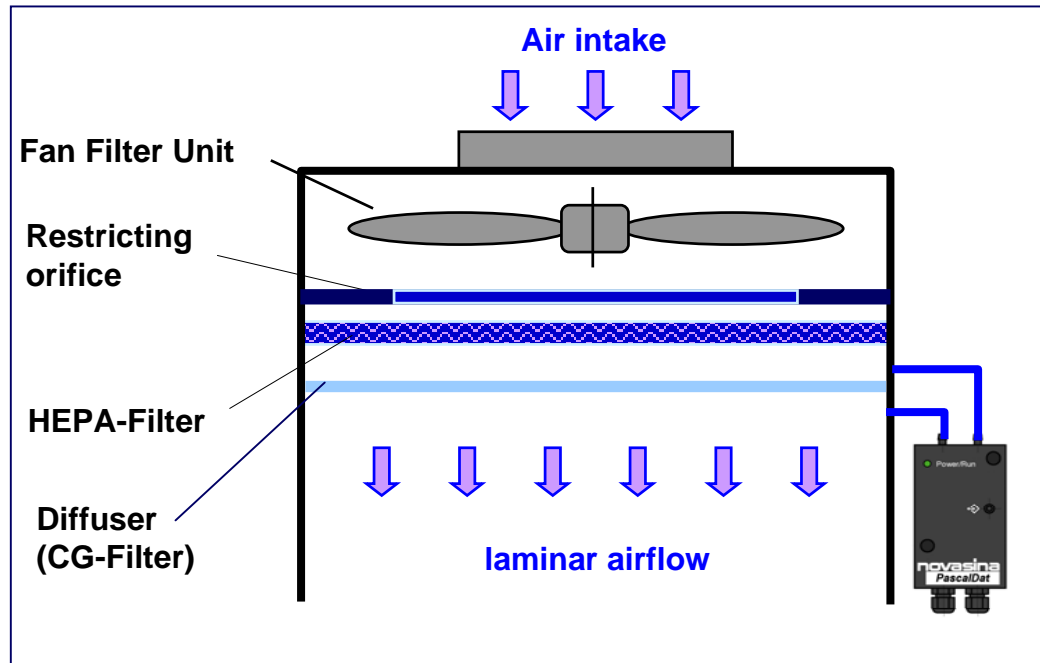**heating resistor**

Temp.difference

air flow
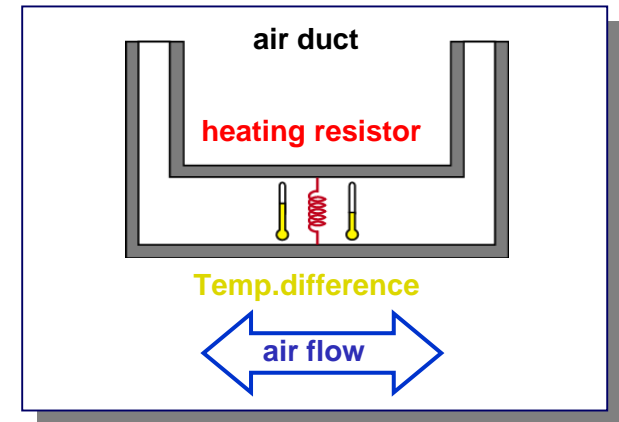
As first company in the world, we apply a new mass flow technology for detecting dP.

This is a key factor that allows to comply with customer needs such as accuracy, reliability and long term duration.

Over 2'000 sold units without any complaints and high customer satisfaction rate are the prove.

Air velocity determination by conversion of differential pressure

Air intake

Fan Filter Unit

Restricting orifice

HEPA-Filter

Diffuser (CG-Filter)

laminar airflow

PowerRun

novasina PascalDat

VERSATILITY OF Pascal TRANSMITTERS

Besides measurements in clean rooms, Pascal transmitters can be used as well for detecting laminar airflows in flow boxes and for filter monitoring in Fan Filter Units.

Operators of flow boxes, mini environments etc. benefit from the stability, reliability and absence of hysteresis that permits a precise FFU controlling.

By placing the transducer nozzles with a diffuser in between, the built up dP in the space above the diffuser can be converted into an air velocity in m/s.

IMPORTANT: As every installation has other flow characteristics, the Pascal dP transmitter has to be calibrated and adjusted against a reference air velocity meter before use.

Accurate on site calibration of dP-transmitters
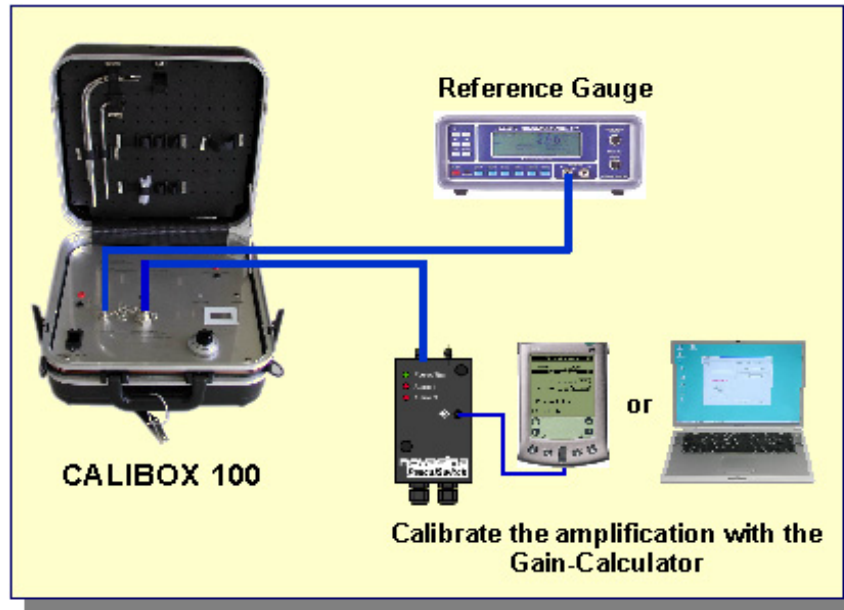
Technical data:

Device-type	Calibox 100	Integrated sensor	PascalVision 100
Pressure range	0 ... +100 Pa	Max. resolution	0.07 Pa
Analogue output	0...10 V, 2...10 V 0...20 mA, 4...20 mA	Measurement interval	150 ms...1350 ms
Operating temperature	0 ... 50°C	Time constant	10 ms
Digital interface	RS 232	Accuracy	< 17 Pa = ± 0.25 Pa ≥ 17 Pa = ±1.5% m.v.
Supply	85 ... 265 VAC	Temperature effect	< 0.05% m.v./°C
Dimensions (WxDxH)	340 x 360 x 180 mm	Atm. pressure effect	0.1% m.v./hPa
Weight	approx. 5 kg	Hysteresis	0.00%
		Offset-Drift	< 0.1 Pa/year
		Overpressure resistance	2 bars
		Mass-flow	370 sccm (0.37 litre/min)

Reference Gauge

or

CALIBOX 100

Calibrate the amplification with the Gain-Calculator
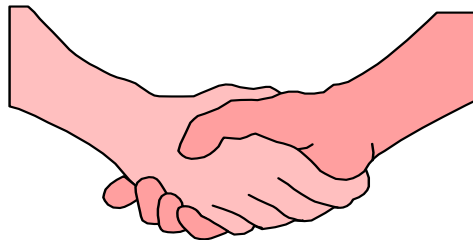
CALIBOX HIGHLIGHTS:

- ✪ **Special air generator in that allows to get low and stable pressures < 0.5 Pa**
- ✪ **High accurate dP measurement sensor for detecting the generated pressure**
- ✪ **High precision regulator with arrest lever**
- ✪ **Stove compartment for documents and accessories as hoses, power supply etc.**
- ✪ **Universal use – The CALIBOX permits a calibration of all dP-transmitter types**
- ✪ **The CALIBOX can be certified by a accredited laboratory**

Novasina, a leader in high accuracy differnetial pressure measurement.

! Thank you for your attention !

Pascal dP-transmitters / Calibox mobile dP-calibrator