EQUINLAB
Equipos para la Industria y Laboratorio

novasina
The Art of Precision Measurement

Static differential pressure measuring instruments

Pascal-ST/Z

for low measurement ranges

0 ... +50 Pa oder 0 ... +200 Pa

AGENDA

- *Pascal-ST/Z series*
- *Measurement principle*
- *Highlights*
- *Technical data*
- *Installation*
- *Configuration*
- *Calibration & Adjustment*
- *Applications*
- *References*
- *Closing words*

Pascal-ST/Z series

Pascal-STS/Z
Pascal-STVS/Z

Monitoring & Visualisation

- 2 alarm relays and LED displays
- STVS version with additional LC-display
- Automatic Zeropoint calibration

Pascal-STD/Z

Control

- Scalable, adjustable analogue output (V/mA)
- Digital signal output via RS-232
- 2 Alarm LED displays
- Automatic Zeropoint calibration

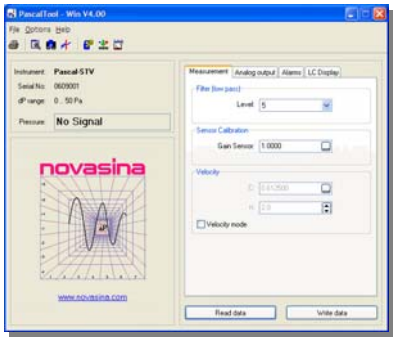
Pascal-STV/Z

Control & Visualisation

- Scalable, adjustable analogue output (V/mA)
- Digital signal output via RS-232
- 2 Alarm LED & LC-displays
- Automatic Zeropoint calibration

PascalTool-Win

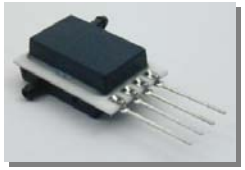
Configuration

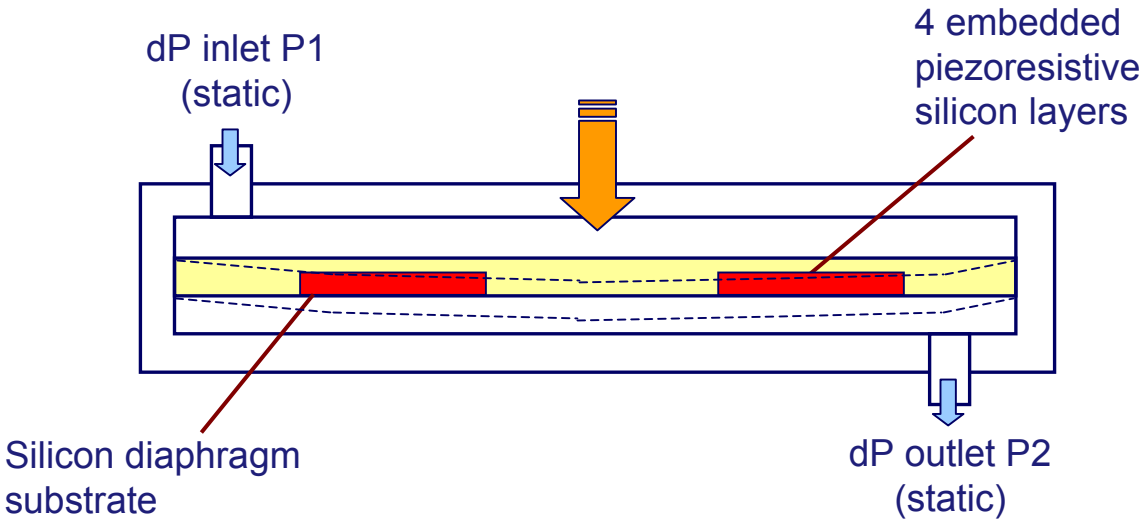


- Configuration software for
  - Sensor & AO adjustment
  - Alarm threshold setting
  - Password setting and other configurations

STATIC MEASUREMENT PRINCIPLE

Silicon membrane sensor





Strain of the piezoresistive silicon => Change of resistance => Electrical output => Differential pressure

Advantage: due to a static dP mesurement, there is no need to compensate any connected hoses -> easy mounting and start-up of the system

PRODUCT HIGHLIGHTS

- Versatile in use -> Monitoring and controlling of differential pressures and air velocities
- Compact Design -> ideal for narrow spaces
- Accurate and reproducible measurements
- State-of-the-Art silicon membrane sensor technology
- No Zero-Drift -> automatic Zeropoint calibration
- Easy installation and start-up
- Adjustable dP sensor and signal outputs
- Password protection system
- Configurable and adjustable with *Pascal-Tool WIN* software

TECHNICAL DATA

For all Pascal-ST/Z types

Measurement range (uni-directional)	0 ... +50 Pa / 0 ... +200 Pa
Max. resolution	0.1 Pa
Measurement interval (configurable)	approx. 20 meas./sec.
Accuracy at 20°C (FS = full scale)	± 0.6% of FS (0...+50Pa) ± 0.2% of FS (0...+200 Pa)
Temperature effect	< 0.01 Pa/°C (0...+50 Pa) < 0.03 Pa/°C (0...+200 Pa)
Hysteresis	± 0.15 Pa (at constant temp.)
Offset-Drift	± 0.15 Pa (automatic zero point calibration)
Max. admissible overpressure	± 20‘000 Pa
Operating temperature	5 ... 45°C

DEVICE SPECIFIC DATA

Pascal-STS/Z & Pascal-STVS/Z

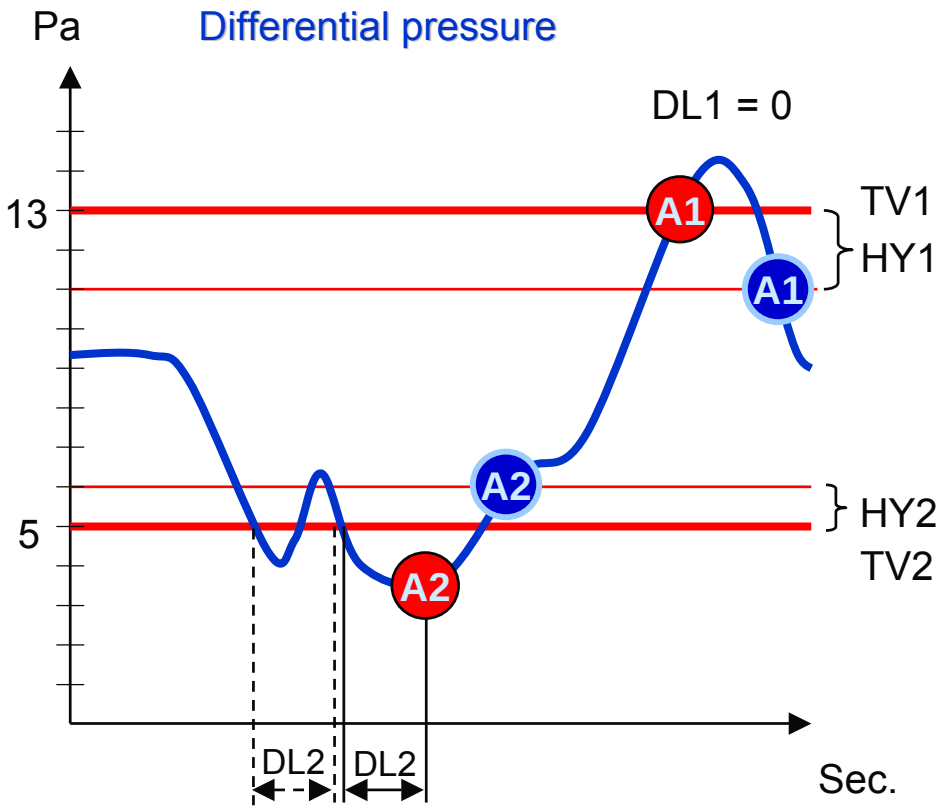
2 programmable alarm thresholds (< >)	**0.01…49.99 / 0.01…199.99 Pa**
2 relays (open & make contact)	**max. 48 V / 2 A and 60 W**
Protection	**IP 54 / EMC**
Power supply	**10.5 ... 35 VDC**
Power consumption	**max. 2.5 W**
Options:	
External power supply	**90 ... 260 VAC**

ADJUSTABLE RELAY ALARM POINTS

Pascal-STS/Z & Pascal-STVS/Z

		setting
TV1	→ Threshold value 1	>13 Pa
TV2	→ Threshold value 2	<5 Pa
HY1	→ Hysteresis value 1	2 Pa
HY2	→ Hysteresis value 2	1 Pa
DL1	→ Delay 1	0 s
DL2	→ Delay 2	5 s

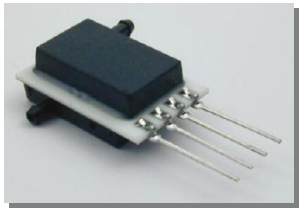
A1	set	Alarm 1
A1	reset	Alarm 1
A2	set	Alarm 2
A2	reset	Alarm 2

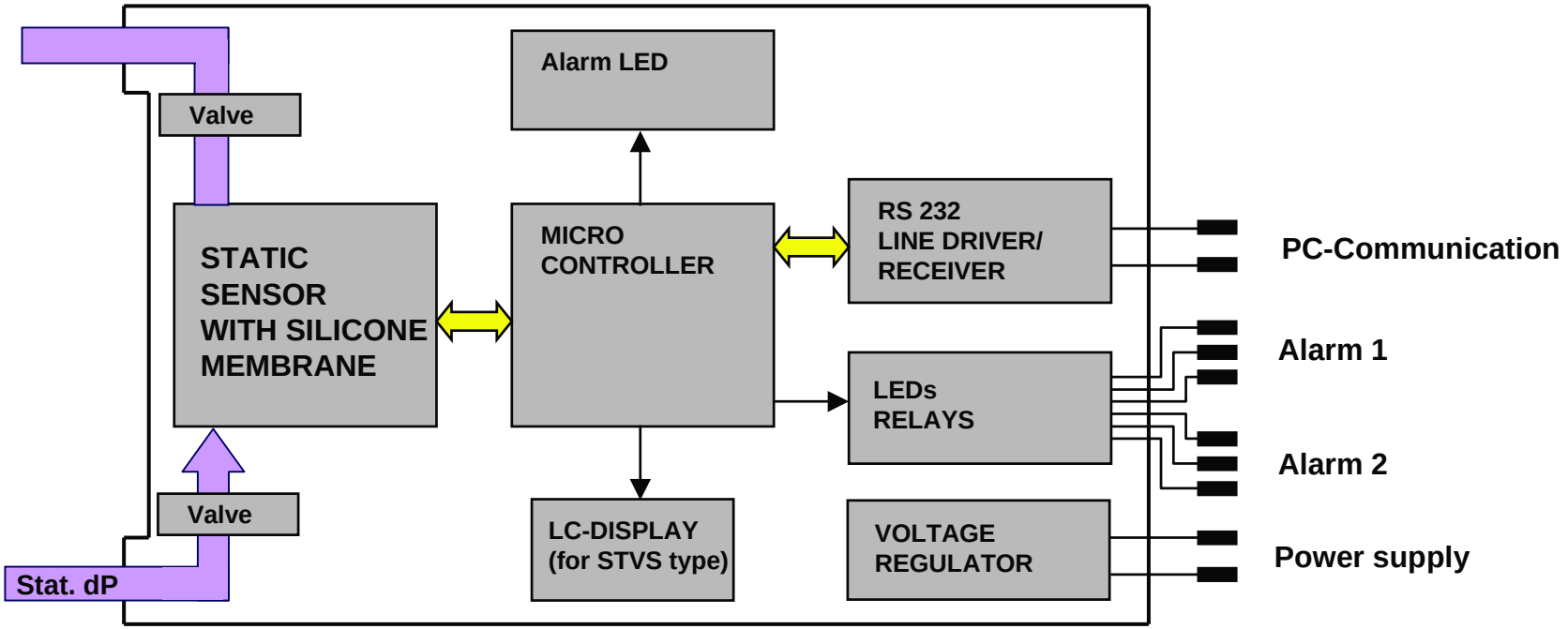


SIGNAL PROCESSING

Pascal-STS/V & Pascal-STVS/V

Membrane sensor





DEVICE SPECIFIC DATA

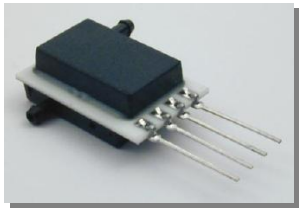
Pascal-STD/Z & Pascal-STV/Z

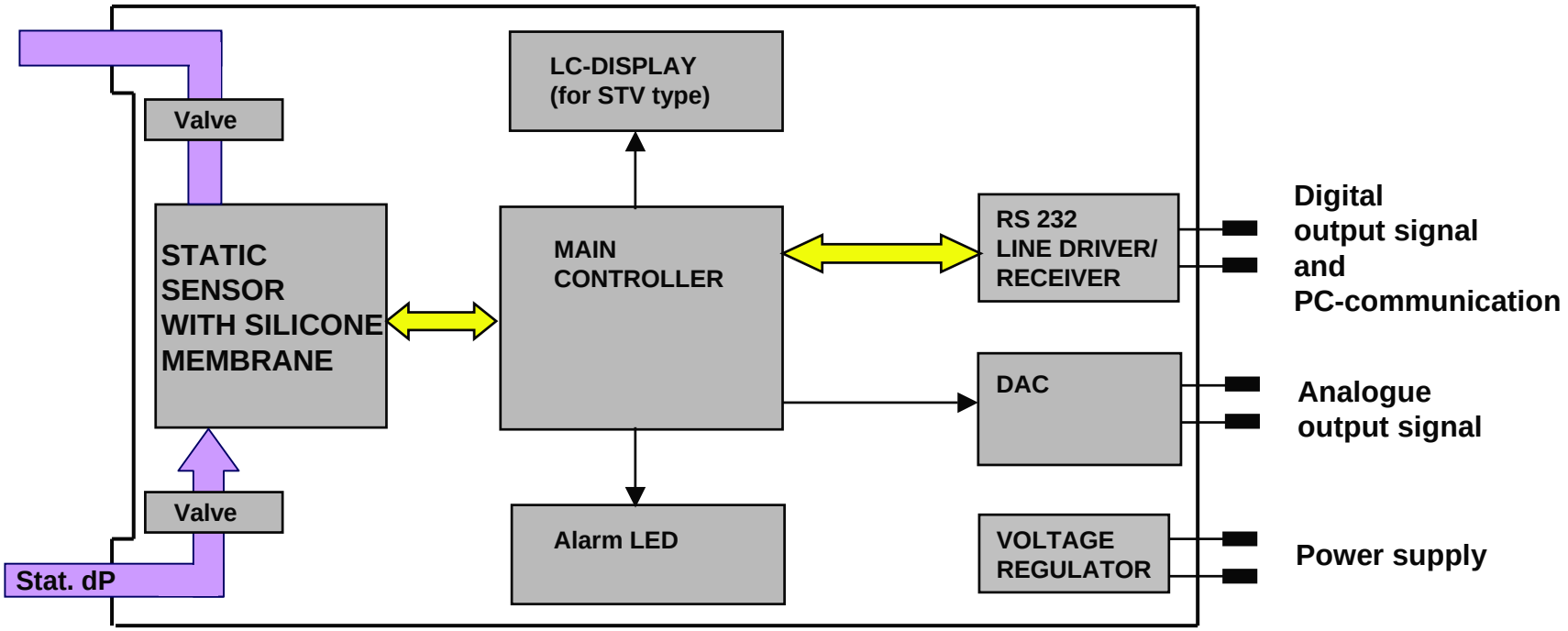
Analogue output (configurable & adjustable)	**0 ... 10 V, 2 ... 10 V** **0 ... 20 mA, 4 ... 20 mA**
Digital interface (ASCII-string or Complex Protocol)	**RS232**
Protection	**IP 54 / EMC**
Power supply	**10.5 ... 35 VDC**
Power consumption	**max. 2.5 W**
Options:	
External power supply	**90 ... 260 VAC**

SIGNAL PROCESSING

Pascal-STD/Z & Pascal-STV/Z

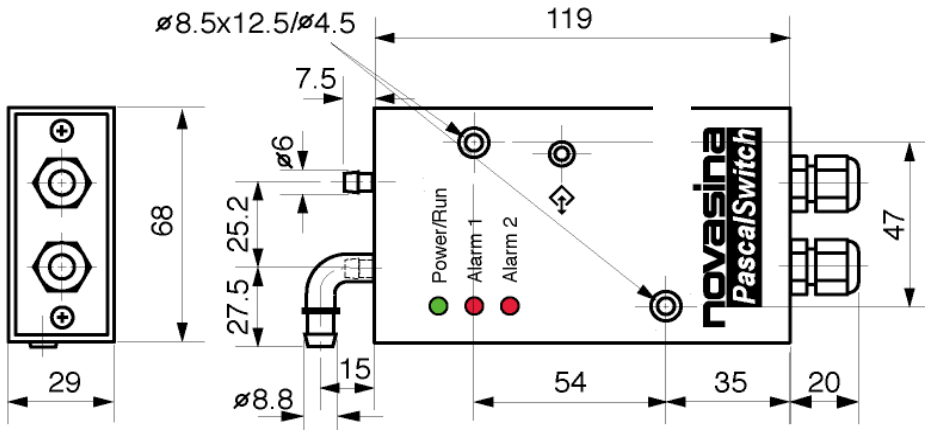
Membrane sensor





SUITABILITY FOR CLEAN ROOMS

- **Compact design**



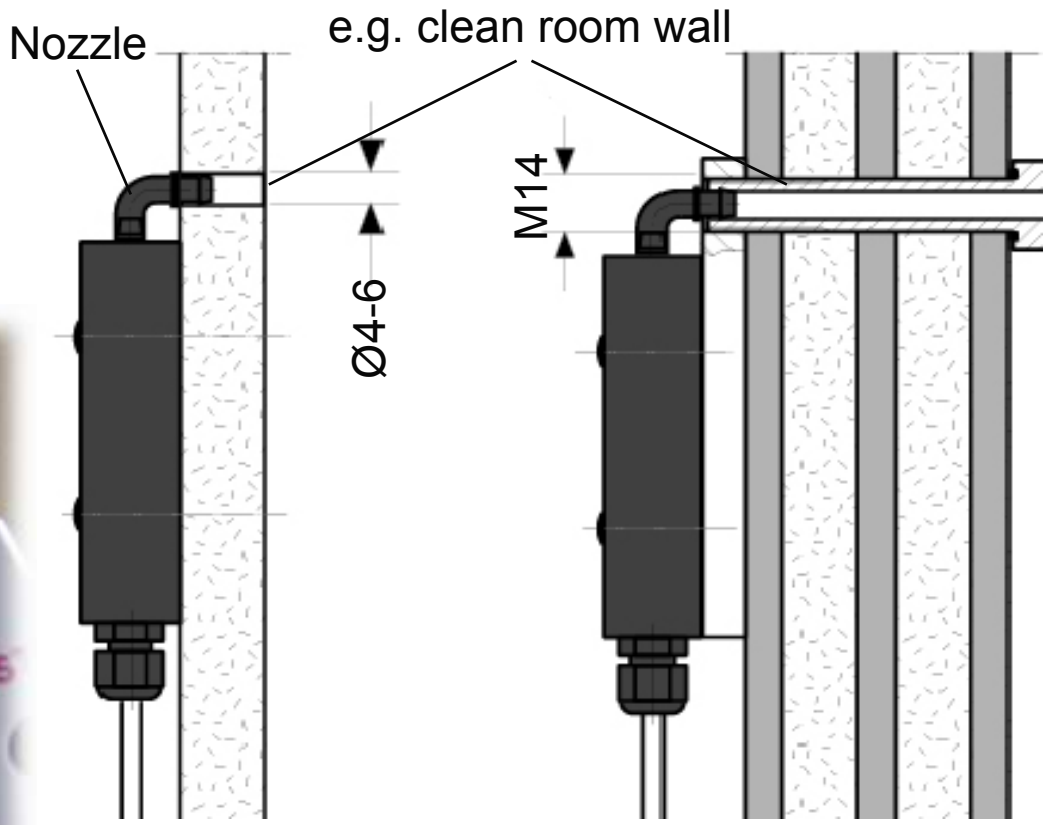
- **Protection** — **IP 54 / EMC**

- **Resistant materials** — **PBT housing**
(Polytetramethylenterephthalat)

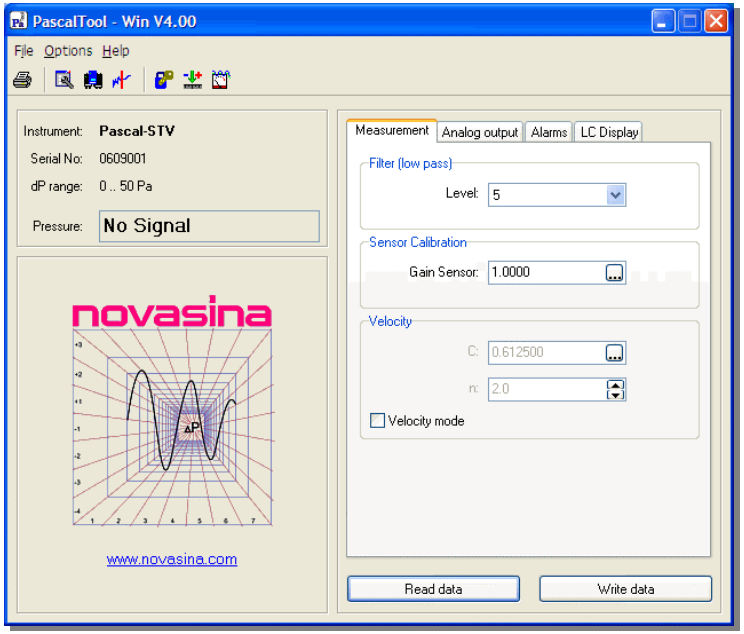
- **Smooth surfaces** — **Avoids deposition of unwanted substances**
(e.g. bacteria)

EASY AND QUICK INSTALLATION

Hose
diameter 4 – 6mm



CONFIGURATION SOFTWARE Pascal-Tool WIN



runs on Windows (Windows 95, NT, 2000, XP or newer)

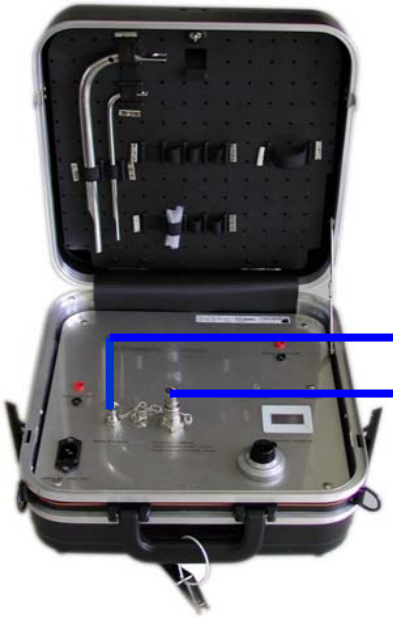
Capabilities

- Filter for measurement value detection
- Sensor adjustment with GAIN factor
- Conversion of differential pressure to air velocity
- Configuration and adjustment of the analogue output signal
- Alarm threshold, delay and hysteresis settings
- Zero point calibration
- Test function for analogue output
- Password protection function
- Selection of various measurement units for LC-Display (only for –STV/Z & -STVS/Z types)

CALIBRATION & ADJUSTMENT

with mobile calibrator

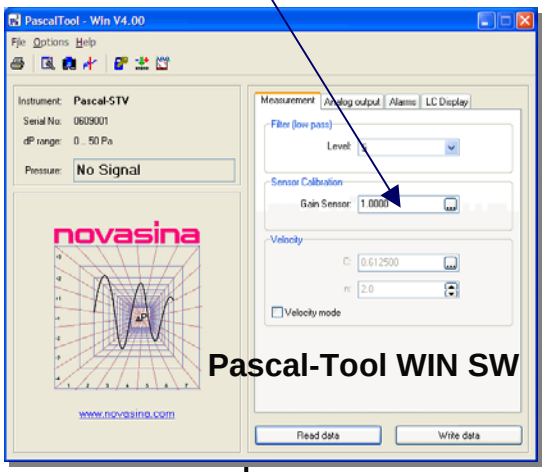
Reference device



Novasina CALIBOX 100
portable dP calibrator

Test sample

Adjustment with GAIN calculator



Pascal-Tool WIN SW

CALIBRATION & ADJUSTMENT

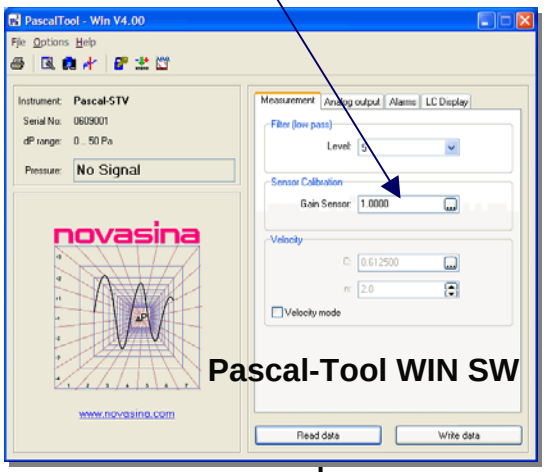
of a complete clean room installation on site

Reference device

Grey room

Clean room

Adjustment with GAIN calculator



Pascal-Tool WIN SW

Test sample

APPLICATIONS

Pharmaceutical

Microelectronic

Microbiological

CLEAN ROOMS

Semiconductor

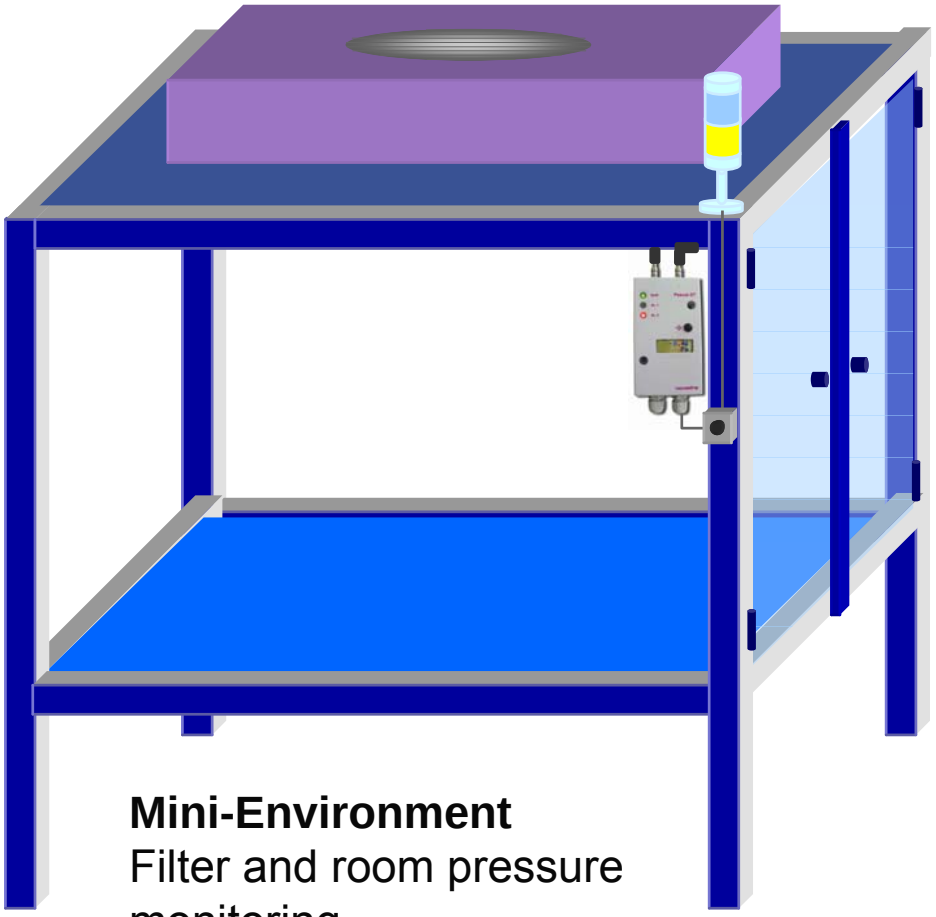
Chemical

Aerospace

Medical

and many more…

Stand alone application

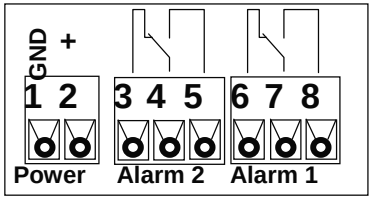


Mini-Environment
Filter and room pressure monitoring

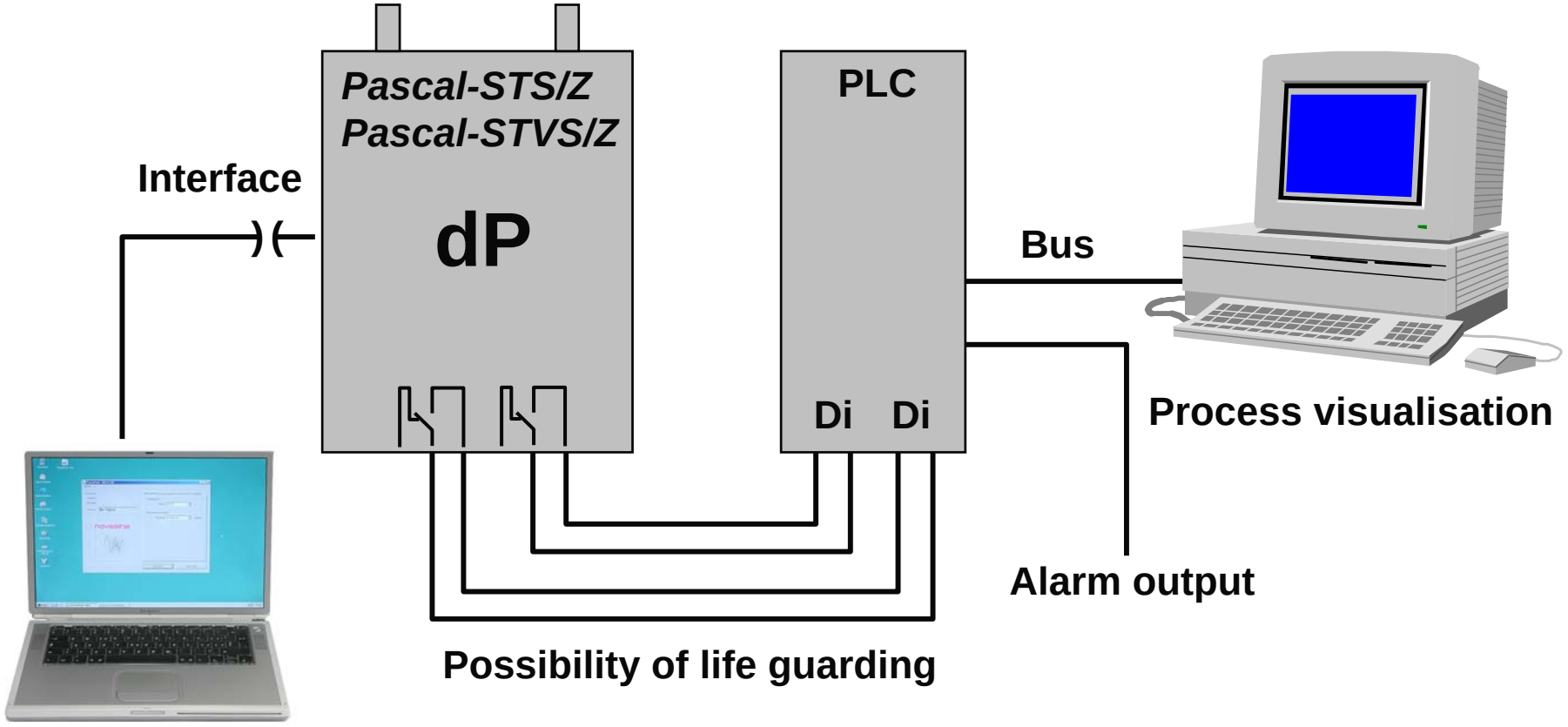
Pascal-STS/Z / -STVS/Z

- **Cost effective**
- **Integrated alarm functions**
- **2 programmable alarm thresholds with 2 galvanic isolated relay contacts**
- **Easy installation**

Electrical connection



Monitoring of Differential Pressure Limits

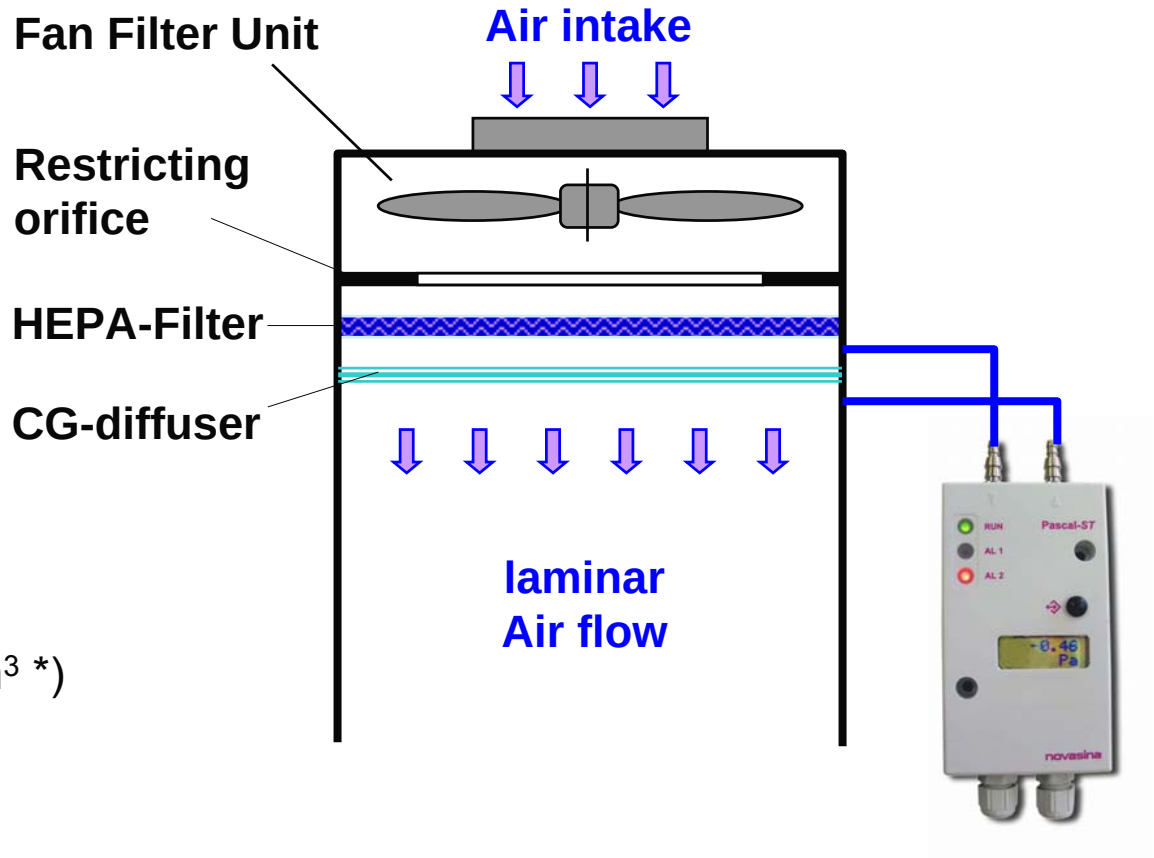


Local configuration incl. password protection by *Pascal-Tool WIN* software

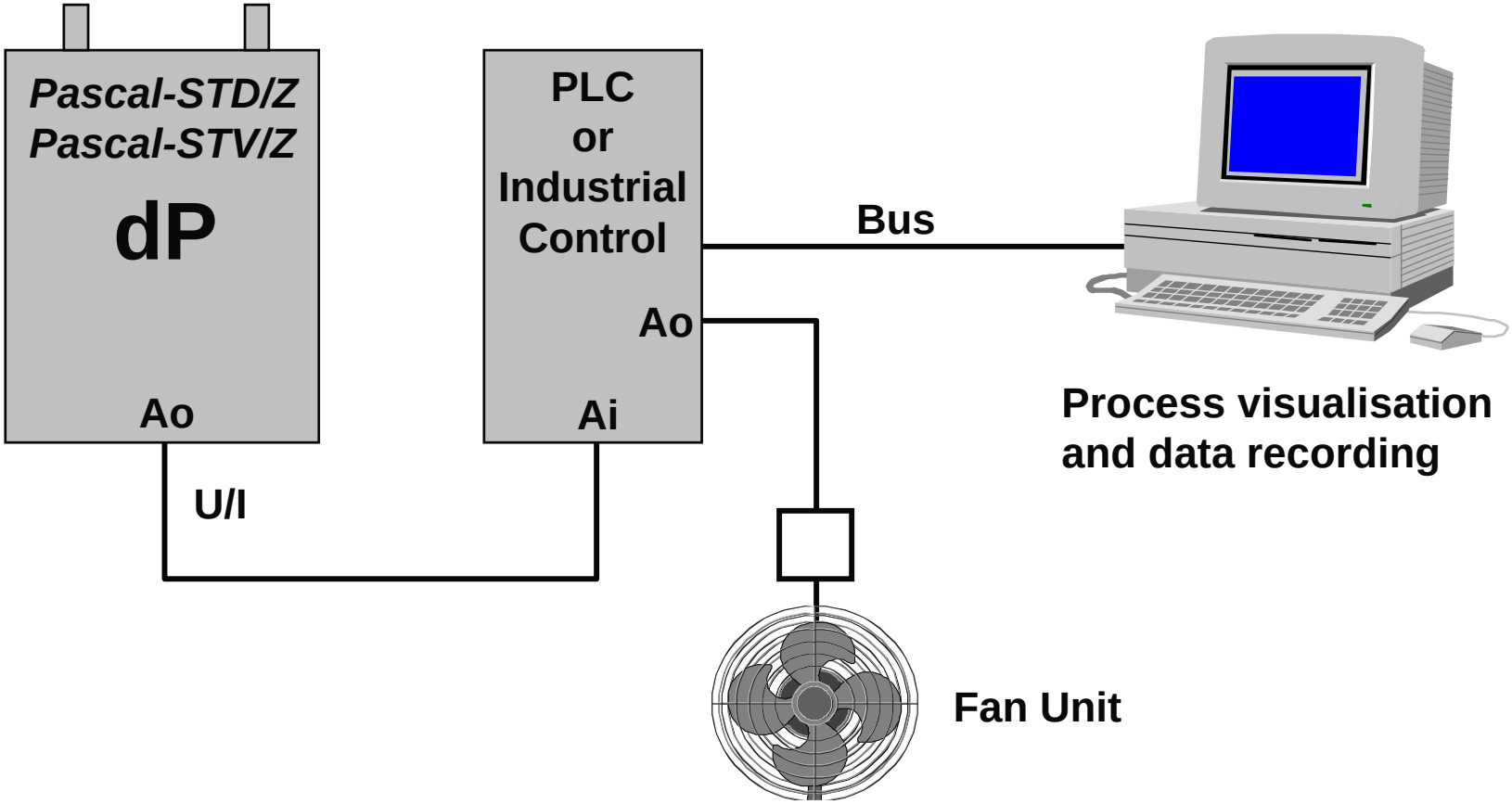
Air velocity determination by conversion of differential pressure

$$V \approx \sqrt{\frac{2 \times dP}{\rho\left(\left(\frac{A_1}{A_2}\right)^2 - 1\right)}}$$

V : air velocity (m/s)
dP : pressure drop (Pa)
ρ : density (air = 1.122 kg/m^3 *)
A_1 : cross-section of air duct
A_2 : cross-section of orifice
* at 25°C and 960 hPa



Differential Pressure Control



REFERENCES

Luwa

RORZE

SII
Seiko Instruments Inc.

SONY

TOSHIBA

DNP

'TORAY'
Toray Engineering Co,Ltd.

HITACHI
Inspire the Next

BROOKS AUTOMATION

m+w zander
total facility solutions

AXIMA

CERN

NOVARTIS

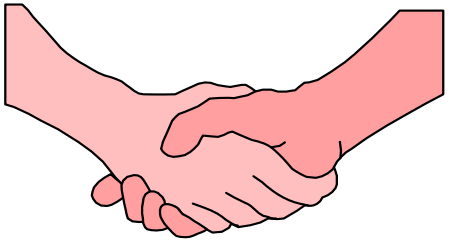
Boehringer Ingelheim

PHARMACIA

Schering-Plough

novasina
The Art of Precision Measurement

YOUR PROFESSIONAL PARTNER FOR ACCURATE MEASUREMENT OF DIFFERENTIAL PRESSURE AND AIR VELOCITY IN LOW MEASUREMENT RANGES



! Thank you for your attention !