Electronic pressure controller

Which features does a pressure controller from Vögtlin have?

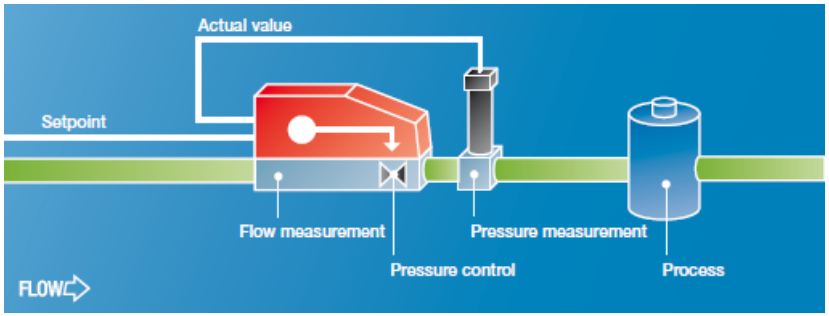
The electronic pressure controller regulate the front- and back-pressure and simultaneously measures the flow. Basically we combine a thermal mass flow controller with a pressure transmitter.

The pressure transmitter can :

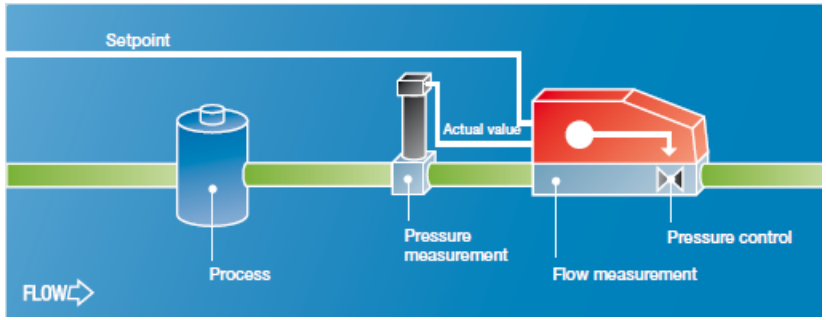
- be mounted directly on the device (when the process is located directly behind the pressure transmitter)
- be installed separately (cable length 5 metre)
- be an already existing pressure sensor (preferably 4-20 mA)

By digital communication the function can be switched between **pressure control and flow control**.

Difference between front and back pressure control

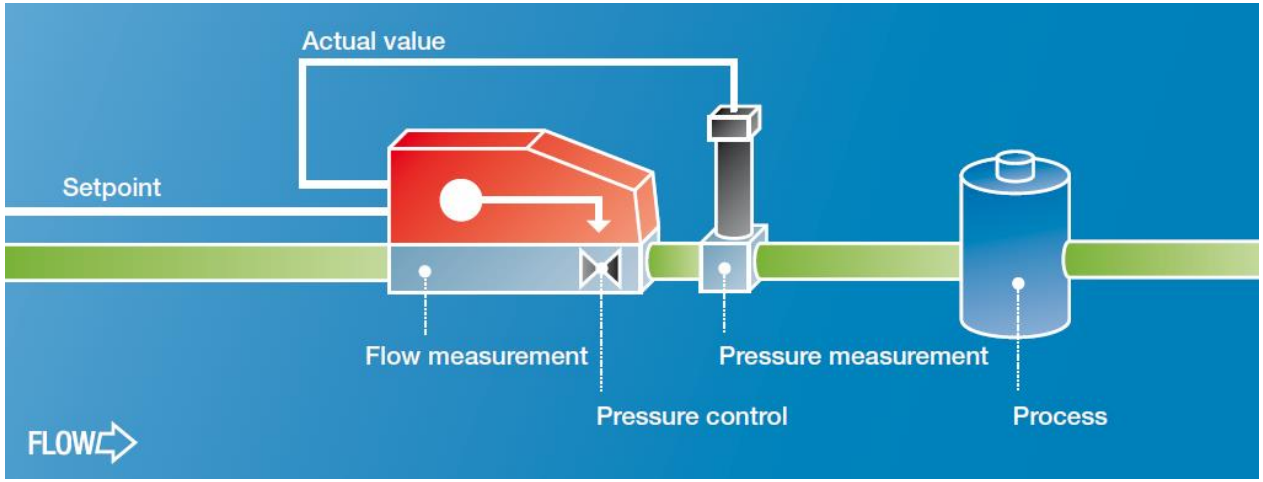


Pressure control (front), Upstream test (Process) is located **after** the control valve. Dynamic range up to 1:200



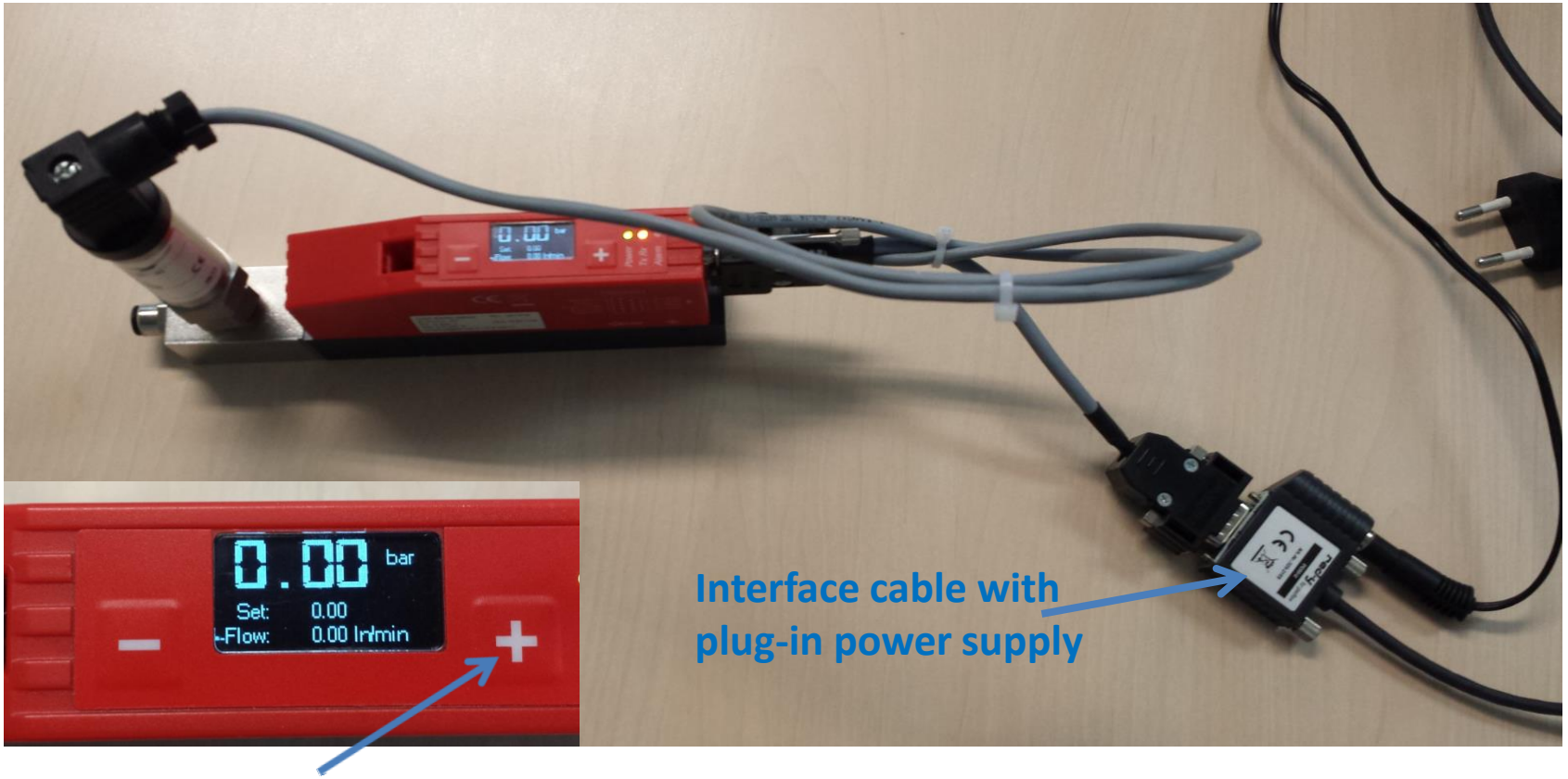
Back pressure control, Downstream test (Process) is located **before** the control valve. Dynamic range must be calculated. Decisice is the pressure drop over the control valve at the desired flow.

Set-up of a Vögtlin's pressure controller



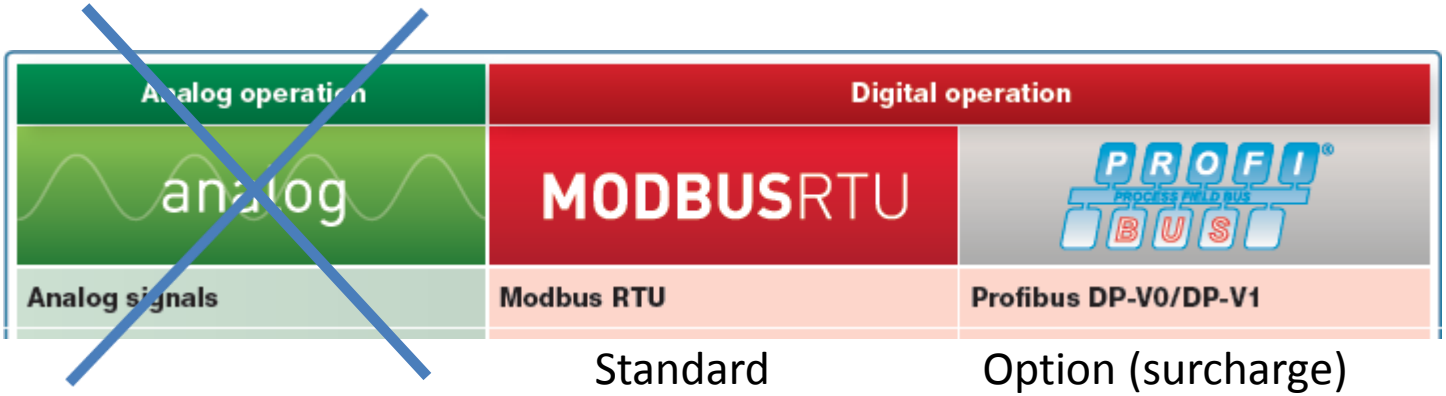
The actual value from pressure transmitter (4-20 mA) will be connected to the analog setpoint input from the pressure controller
Therefore the device can be **exclusively digitally** operated (Modbus RTU; Profibus DP oder Lab-View)

How can a pressure controller be operated ?



Option: **Direct setpoint setting** with the display of actual values and flow (surcharge upon request)

Communication



Standard

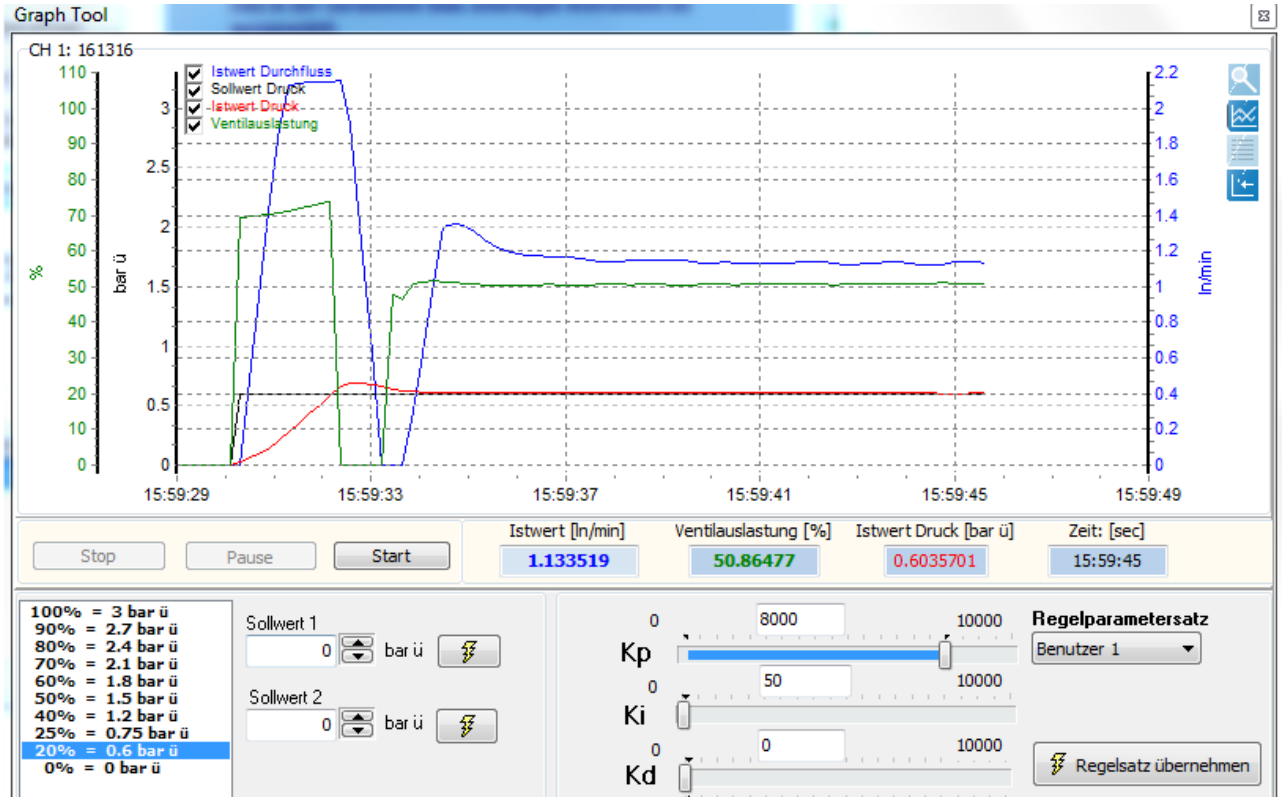
Option (surcharge)

free of charge

LabVIEW-driver can be downloaded here :

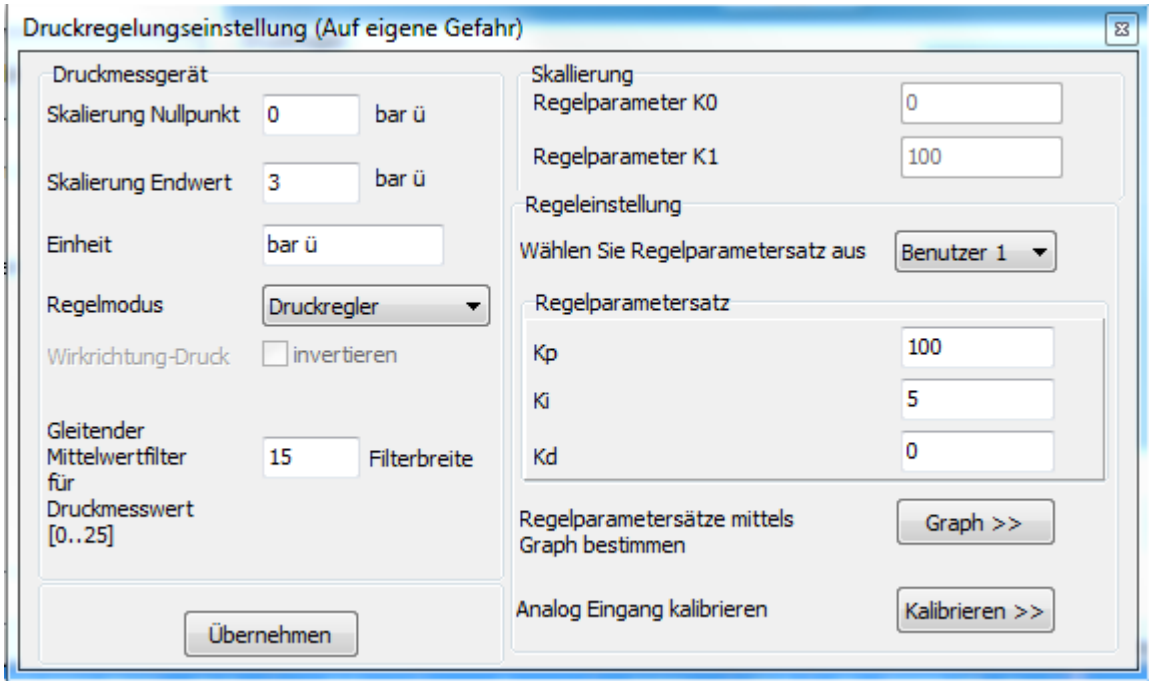
https://www.voegtlin.com/en/support/download/?gv_search=LAB&filter_6=&filter_2=&mode=all

Software get red-y



You can directly «drive» the pressure controller with our *free-of-charge* Software **get red-y**. In addition, the ***Kp*** and ***Ki*-**value can be optimized for your application.

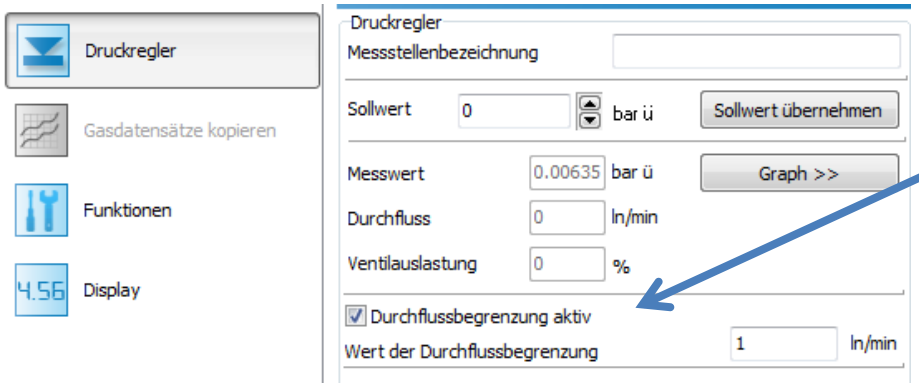
Software get red-y



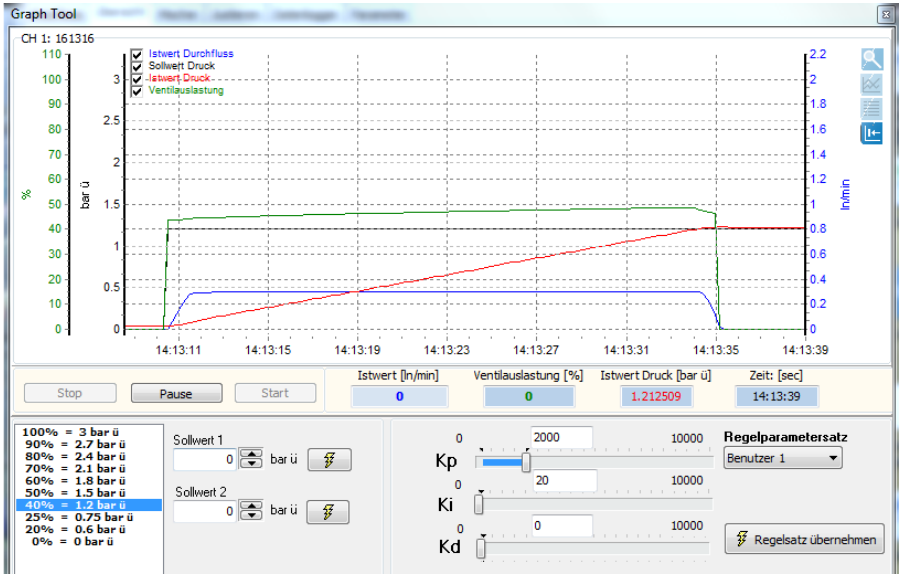
High flexibility:

- The pressure transmitter can be replaced (e. g. for a different pressure range)
- The customer can himself switch between the front- and back pressure fonction.

Flow-limitation



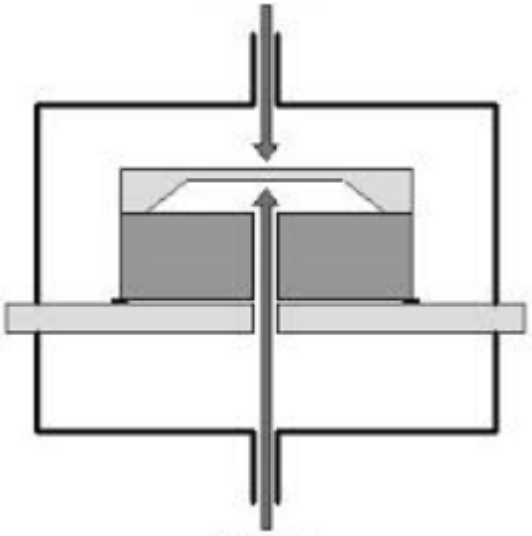
If needed the pressure regulator can be set, in such a manner that a defined flow cannot be exceeded.



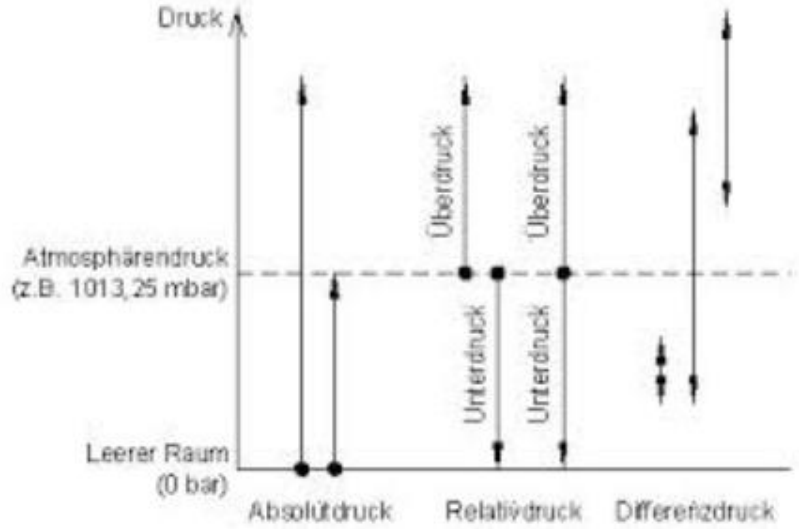
With this function the «slop» of the pressure increases can be defined. This example describes that the setpoint could not be exceeded.

Setting-up pressure measurement cell

Pressure P1



Pressure P2
process pressure

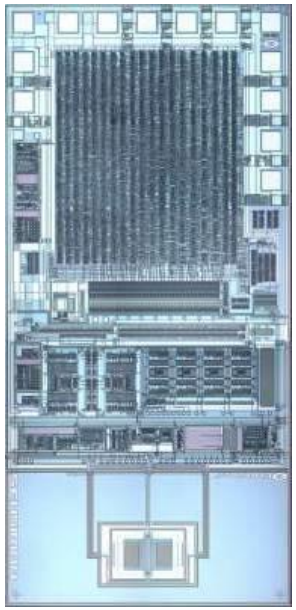


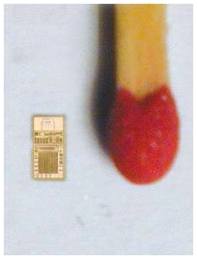
Basically each measuring cell measures a differential pressure

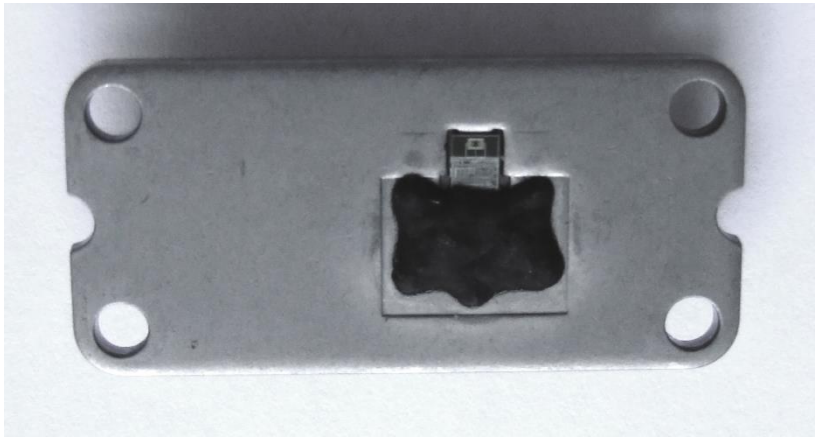
One side of the diaphragm(P1) is

- is being evacuated of 0 bar abs (**Absolute pressure**)
- openly against environment (**Over pressure**)
- There is a x-desired pressure (**differential pressure**)

Setting-up flow sensor







- Large cross sections and therefore less sensitive to contamination
- Very easy to clean with alcohol
- The Sensor is placed directly in the gas flow and thereby ensures a fast and accurate measurement

What must be taking into consideration during the sizing phase ?

The determining parameters are:

- Which of the two (**front- or back-)** pressure control are concerned ?
- Which pressure should be regulated (**measuring range and unit of pressure measurement**)
- How high is the **volume to be controlled**?
- How high is the **basic flow rate (Leakage)** and the maximum flow?
- **In which time** should be regulated a volume at a certain pressure ?
- Is permitted to have an **Overshoot** in the pressure control ?

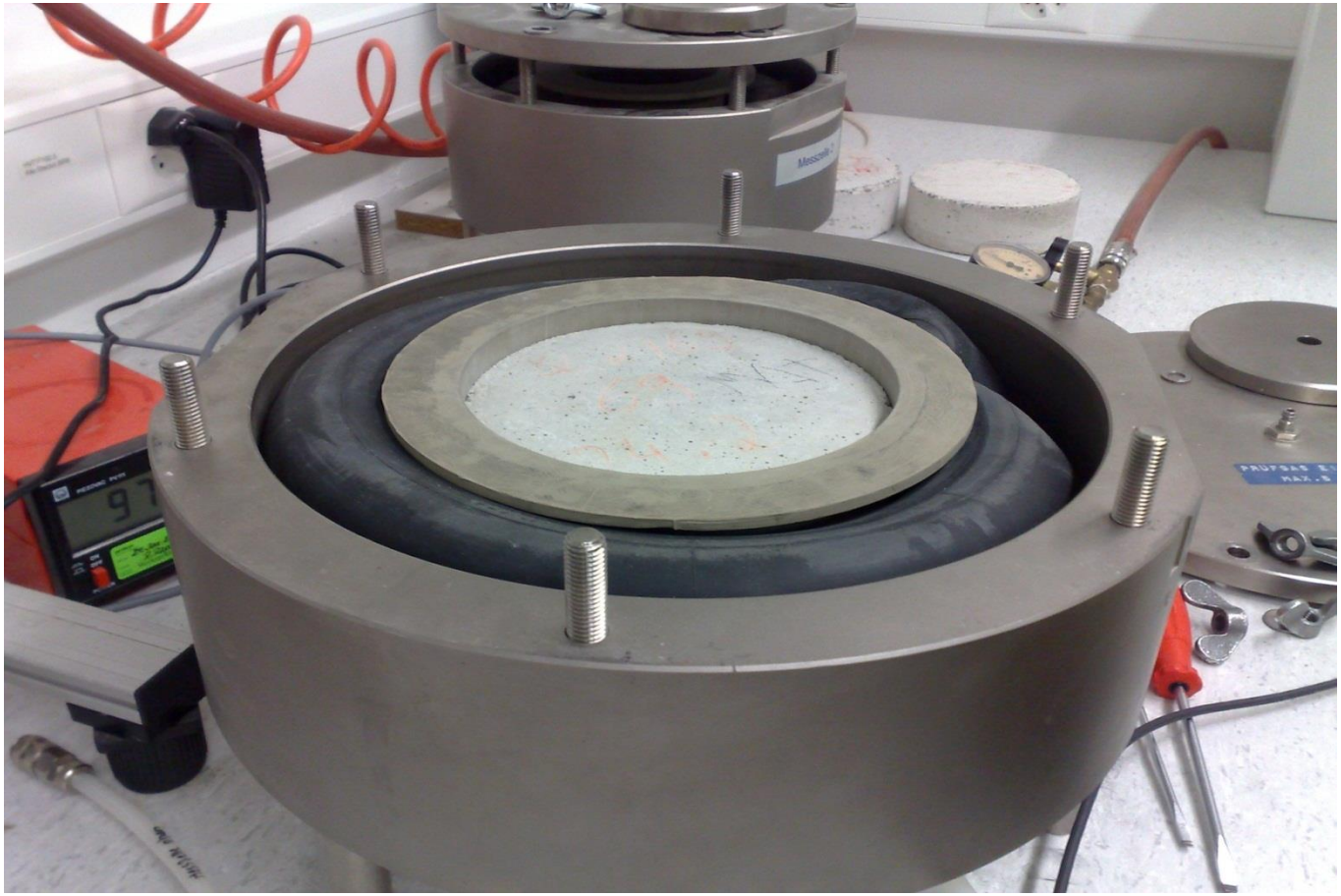
What are the possible disturbing influences ?

- The gas supply is **not stable** (e. g. pulsating pump)
- **temperature influences** cause a unstable pressure
- There is no drain **(Leakage)**
- The pressure controller is configured **too large or too small**
- There is no, a too small or a too big **buffer volume**
- The **mounting positions** by small measuring ranges had not been observed
- The pressure transmitter is too far from the device under test (mis-measurement due to **pressure drop over the pipe**)
- The pressure controller responds too quickly or too slowly **(swings strongly)**

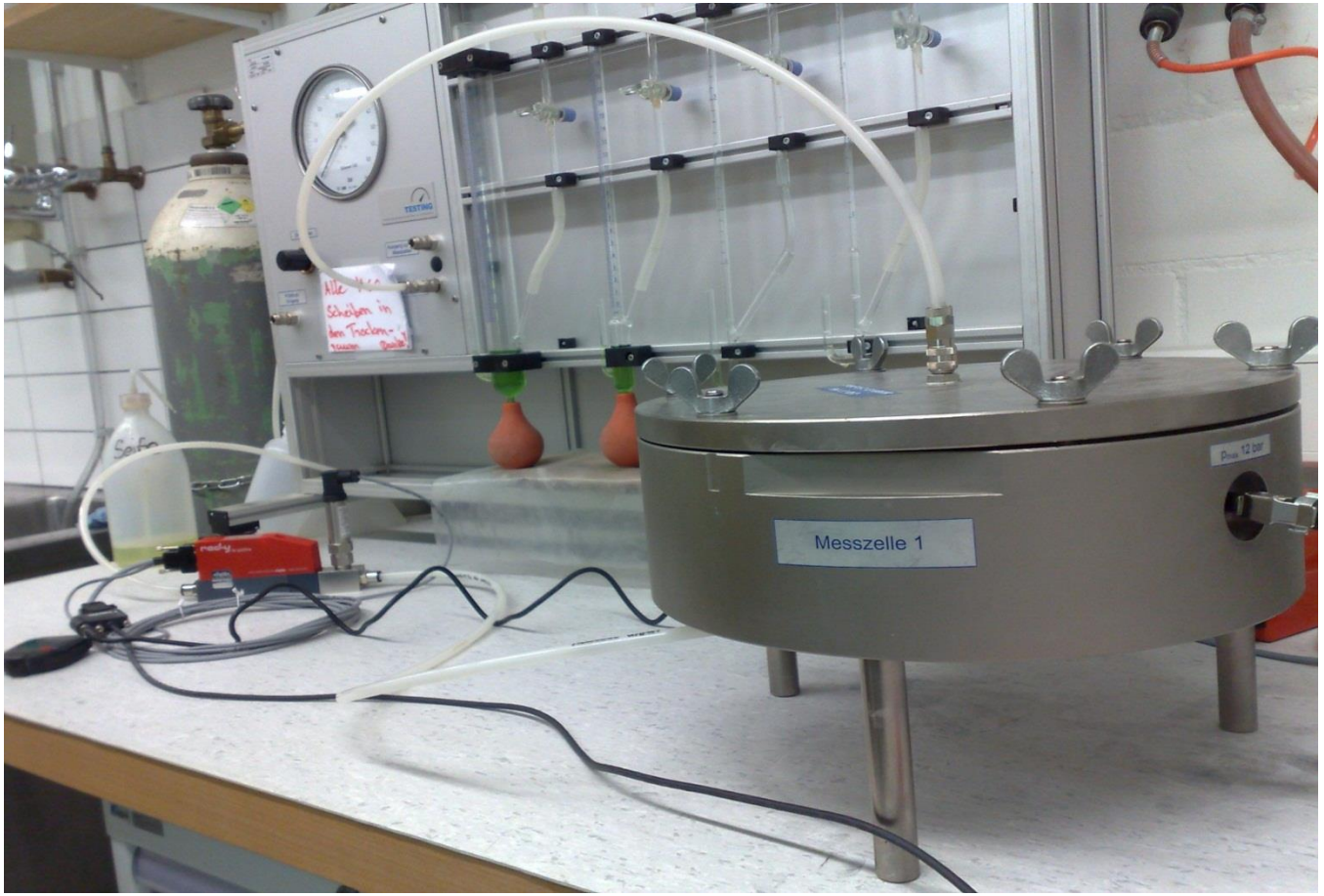
A few application examples

- Permeability measurements of concrete
- Part inspections of inhalers (medical)
- Permeability test of membranes
- Leaktest of sterile walls
- Online-gas mixer
- Calibration equipment of Test-leaks

Permeability measurements of concrete



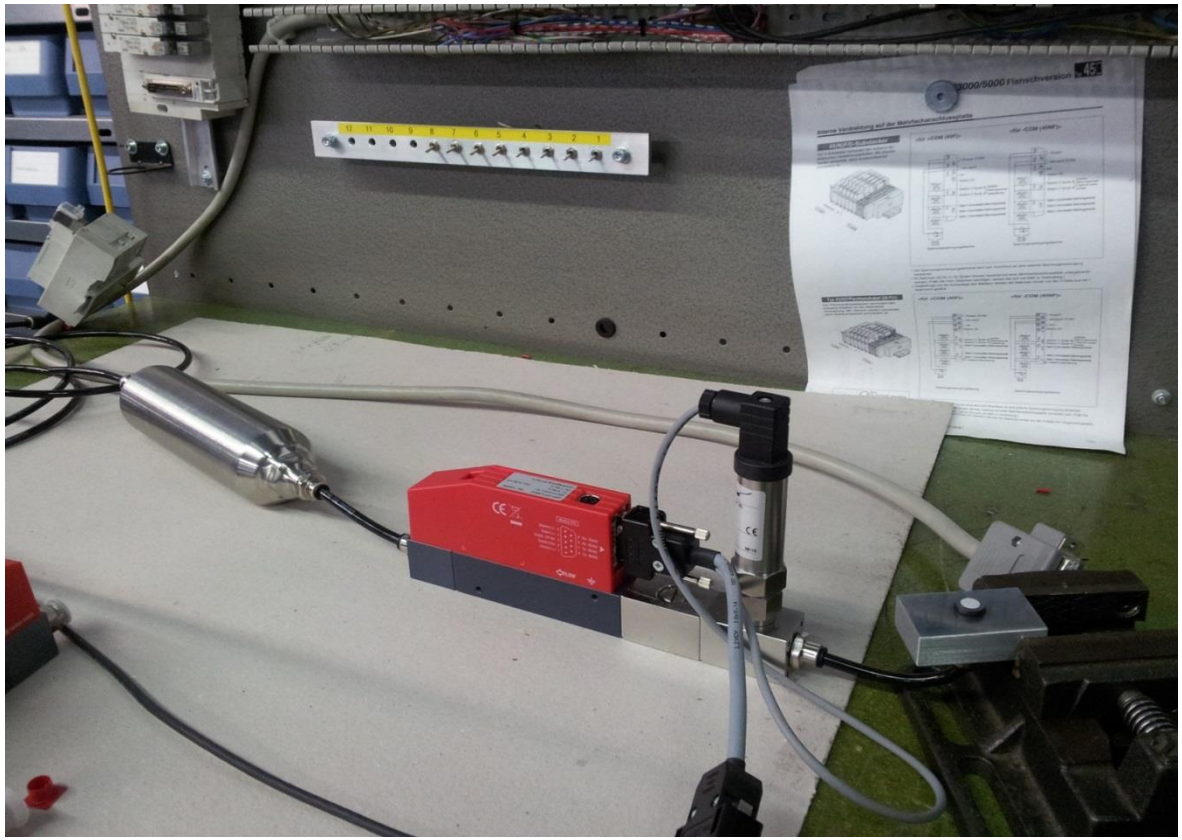
Permeability measurements of concrete



Part inspections of inhalers

With the aid of a vacum pump air is sucked in by an inhaler. This test will allow to verify that a flap provides acces to the drug substance at a certain flow rate (e.g. Ventolin©).

Permeability test of membranes

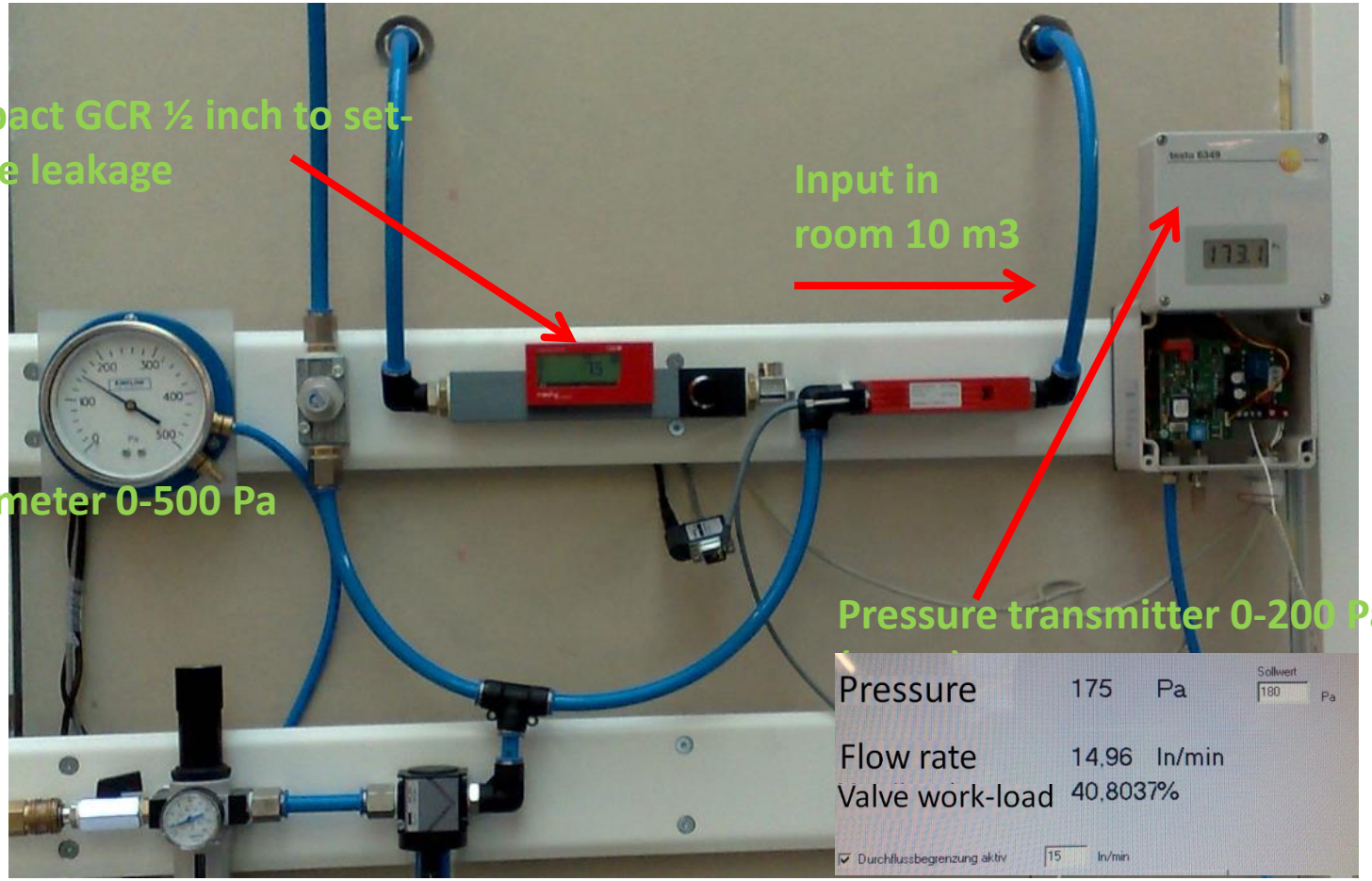


A membrane have to be tested at a underpressure of 20 mbar for definite flows

Lecktest of sterile walls

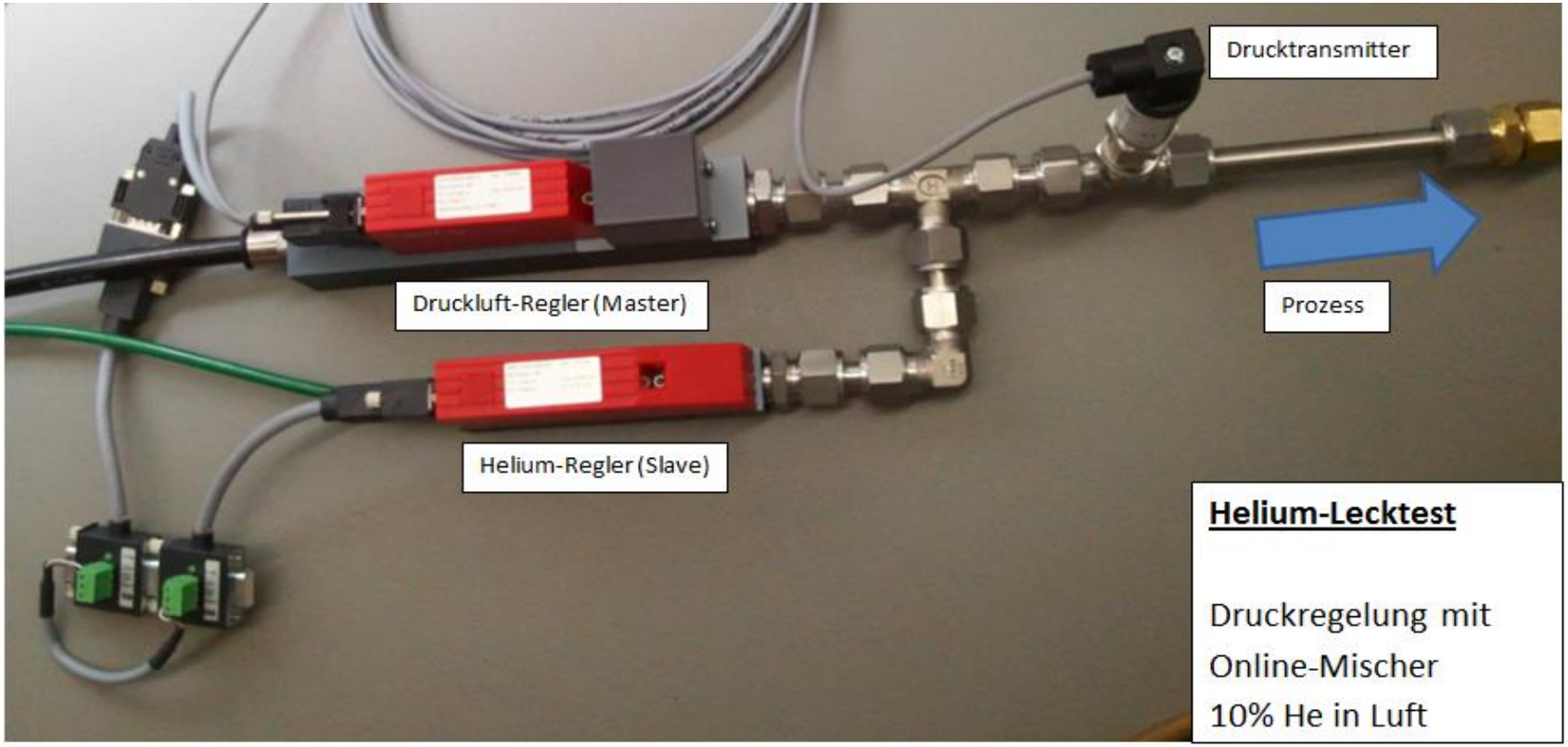
Objective:
Sterile walls must be to the permeability (flow rate) at a pressure of 0-200 Pa (0-2 mbar) reviewed.

Lecktest of sterile walls



Leakage = GSC (15 ln/min) – GCR (7.5 ln/min) = **7.5 ln/min at 1.75 mbar**

Leaktest with test gases
Online-gas mixer with pressure regulation

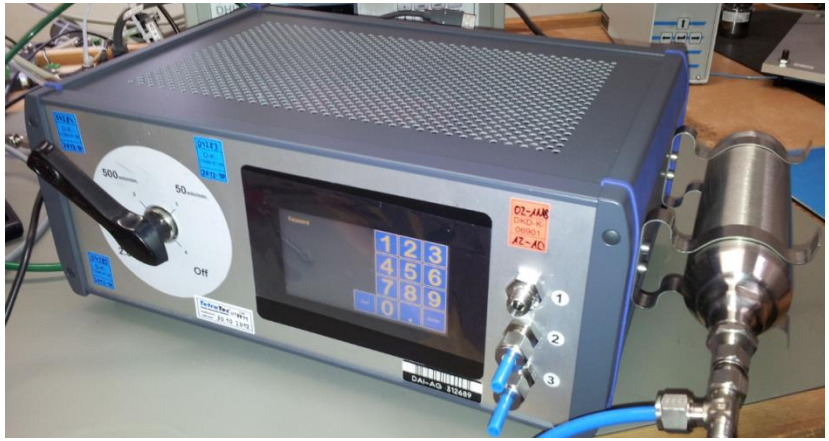


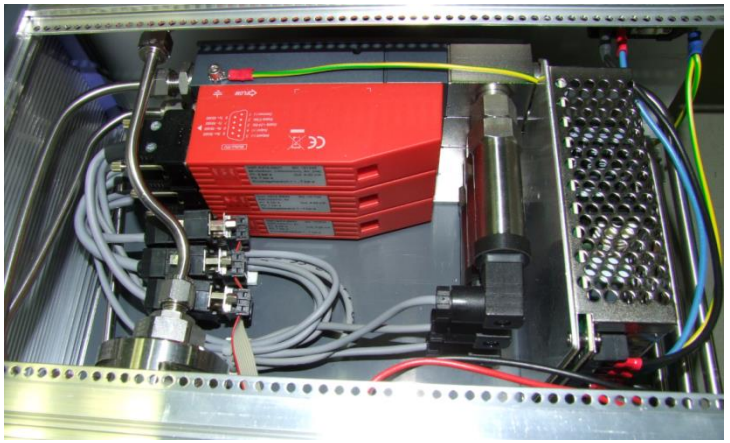
Pressure controller-applications

Calibration of Test-leaks

Test-leaks consist of a glass capillary, with which a defined flow rate is achieved at a specific pressure
Such Test-leaks are used to check leak-test equipment.
As these Test-leaks can cause pollution, they must be regularly checked.

The solution: calibration devide for reviewing test leaks





Pressure controller with simultaneous flow measurement
Dakks calibration of pressure and flow.
50 mln/min; 500 mln/min und 2000 mln/min

Calibration device for testing Leak-test

The calibration device could be also operated with the get-red-y-Software

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