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MEASUREMENT TECHNOLOGY

Pressure Measurement in the Biotechnology Industry

Application:

Pressure measurement for leak testing dialysis filters

PASCAL CV3110 pressure transmitter

The PASCAL CV pressure transmitter from LABOM enhances the quality and efficiency of testing for leakage and proper functioning for a vendor of dialysis blood filters.

Vital leak testing for dialysis filters

Enhancing the efficiency of filter testing with a compact pressure transmitter design

Fifty years ago when a person was diagnosed with chronic renal failure it meant certain death. Although attempts at hemodialysis and the transplantation of body organs have been made over the centuries, it wasn't until the years between 1912 and 1958 that major advances in these fields took place. With the advent of modern dialysis technology it became possible to prolong the life expectancy of persons suffering from kidney disorders and diseases and in so doing to enable them to wait for a suitable donor organ. A dialyzer acts as an "artificial kidney" to perform vital functions of the human kidney. In conventional home hemodialysis, blood flows in an approximately 30 cm long plastic tube through tens of thousands of capillary fibers that are washed with a dialysis solution. The solution removes metabolic waste products from the blood and neutralizes excess acid. The cleansed blood is returned to the body. The compact design of the model PASCAL CV pressure transmitter from LABOM has enabled one of the world's largest manufacturers of blood filters for dialysis to make significant advances in the quality and efficiency of filter testing. The number of dialysis filters installed on the test rig could be increased and the requirements for precision and hygiene be met.

The task: The filter membrane in the dialyzer is made of a porous material. The pores are so minute that you would have to magnify a square millimeter of the carrier to the size of 100 football stadiums, in order to be able to see it with the naked eye. The metabolic waste products – urinary excreted substances – are small molecules, which diffuse through the pores in the semi-permeable membrane in the dialysis solution, while blood cells and important proteins are blocked from passing through. In the opposite direction, the membrane prevents bacteria and viruses from entering the bloodstream. In view of these complex and vital requirements, the filters are tested for leakage and proper functioning in a test rig. A test pressure is applied to the individual filters and checked with the help of a pressure transmitter. The customer constructed a new production facility for dialysis filters with a 25 % increase in filter throughout. To achieve this higher production rate, the number of filters tested simultaneously on the test rig had to be increased from 6 to 8, without increasing the size of the rig. The legacy pressure transmitter proved to be too bulky for this up-grade.

The solution: LABOM's PASCAL CV3110 pressure transmitter.

The customer benefits: Due to its small and modular housing and hygienic design, LABOM's PASCAL CV is the perfect device for this application. The LABOM measuring device – which is much smaller than devices from other vendors – leaves the customer with sufficient room in the test rig to simultaneously test 8 filters instead of 6. Before final installation in the new

production facility was brought on stream, the customer rigorously tested six model PASCAL CV pressure transmitters for three months in a legacy plant. LABOMs devices successfully proved themselves with regard to hygienic design and zero-point stability after regular sterilization of the test equipment.

The small housing volume and the reduced-volume diaphragm seal ensure that temperature drift caused by changing process and ambient temperatures is minimized. The LABOM devices cool down very quickly after sterilization. Thus, they deliver accurate measurements quicker than most of the competitive devices for all process conditions. Temperature errors arising from temperature variations are removed by the connected electronics and thus compensated.

The PASCAL CV pressure transmitter is especially suited to meet requirements in the biotechnology industry. Its hygienic design complies with EHEDG, FDA and GMP recommendations. Accuracy levels of 0.2 % – which are better than the standard (0.25 %) – for linearity, hysteresis and repeatability can be achieved with the device. The modular design of the PASCAL CV pressure transmitter allows the user to choose the most suitable device for his application. Besides a range of process connections, the PASCAL CV is equipped with smart module technology for indicating, actuating and communication functions. These function modules can be parameterized, upgraded or replaced, without a lot of extra time and effort, and without dismantling the device from the process.

PASCAL CV won out against three competitors for all critical criteria: the customer gained key quality standards for precision and hygiene and was able to achieve enhanced testing efficiency thanks to the compact design.

Author: Rainer Scholz,
Phone: +49 4408 804-423,
e-mail: r.scholz@labom.com

Additional information on this topic is available directly from LABOM (Export Manager Thomas Tempel Fon: +49 4408 804-460) or from our local office near you (see **www.labom.com**).

DEVICE DESCRIPTION :

PASCAL CV3110 pressure transmitter for food/pharmaceuticals/biotechnology

PASCAL CV3110 PRESSURE TRANSMITTER
- nominal range: 0.4 bar
- measuring range setting: turndown 5:1
- accuracy: 0.2 % of adjusted span (linearity/hysteresis/reproducibility)
- measuring range set between -200 and +1,800 mbar
- output signal: 4-20 mA, rising characteristic curve
- alarm state setting: < 3.6 mA
- housing: hygienic housing design with screw cap, IP 66
- material: stainless steel

Process connection:
DIAPHRAGM SEAL DL5130
for food, bio and pharmaceutical industries, aseptic design
- design: for pipes as per DIN 11850 – pipe dimensions as per DIN 11866, table 2, row A
- nominal size: DN 40, pipe inside ø di 38 mm
- process connection: Guth aseptic connection, clamp connection (lug)
- surface roughness as per hygienic design
- wetted materials: stainless steel 1.4435
- diaphragm seal liquid: food-oil, FD1
- conforming to FDA USDA-H1 classification
- operating temperature range: +10 to +140°C