



APPLICATION NOTE

Chemical

Differential pressure measurement for the energy flexible use of heat exchangers in air separation units

- Measuring differential pressures in the warm and cryogenic areas of a test site for the development of load-flexible plant components
- Reliable DP measurement of pressurised air and technical gases with frequent static pressure variations
- Fast commissioning and with measurement data clearly displayed on site

1. Background

An international industrial company operates a test site at one of its locations in Germany to permanently optimise the efficiency of air separators in fluctuating power capacities. Air separators are systems that run on a continuous basis. Energy is used to extract nitrogen, oxygen and noble gases as gaseous or liquid products. The cryogenic process requires gas to be condensed, which in turn requires a lot of energy and thus costs a great deal.

The goal of the test site is to make the operating mode of an air separator load-flexible while taking into account the dynamics of the energy market. This is achieved by further developing system components to better accommodate resulting temperature fluctuations. This way the compressor and production can be shut down when energy prices are at their peak and the power grid has reached its limit. This frees up the power grid and avoids peak power prices.

2. Measurement requirements

Flexible adaptation to the current load change requires dynamic technology. High responsiveness during quickly changing control parameters is a prerequisite. This also applies to the measuring technology used. The company was looking for suitable measuring technology for differential pressure measurement when it comes to the gas currents supplied to the system components in the warm and cryogenic areas of the test site. The technology needed to feature quick response times and guarantee high measuring stability during frequent static pressure changes. The customer also attached importance to easy-to-understand menu navigation and easy-to-use instrumentation.

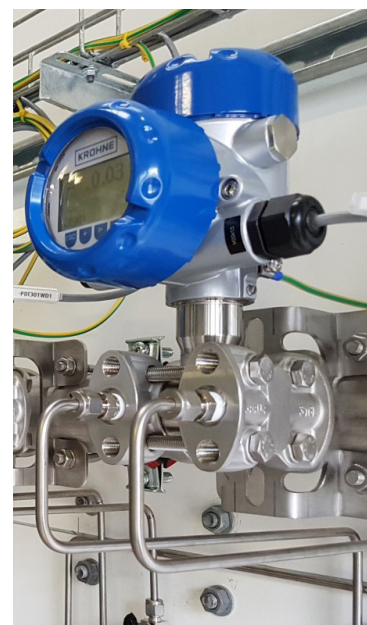
KROHNE

3. KROHNE solution

The customer decided to use 13 OPTIBAR DP 7060 C differential pressure transmitters. The measuring device features an extremely fast response time of <math><125\text{ ms}</math> and sets itself apart with the required measuring stability and availability.

For robust and accurate differential pressure measurement, even under changing process conditions, the OPTIBAR DP 7060 was linearised in all three dimensions during calibration. This "3D linearisation" takes into account differential pressure, ambient temperature and static pressure in all combinations. Since all of the specified operating ranges are covered, stable and accurate measurement can be guaranteed under all process conditions.

The DP signal converter provides extensive diagnostics and configuration functions via the user-friendly display and operating module. Thanks to the standardised connections and the mounting bracket provided by KROHNE, all measuring devices are easy to install and ready to operate.



DP signal converter attached to the wall with a mounting bracket

4. Customer benefits

The OPTIBAR 7060 C reliably measures the differential pressure, providing important information that allows the company to continuously optimise the test site. This way, the pressure transmitter can detect even small drops in pressure, providing insight as to the efficiency of the heat exchanger.

The customer was particularly pleased with the backlit display on the measuring devices. Compared to the signal converters offered by market competitors, these displays make it significantly easier to read the operating statuses, even in poorly lit areas. The two-chamber housing concept also made it possible to install the display in any location, which meant that it was possible to access the display at any time, regardless of the mounting position.

The pre-configured signal converters were directly assigned to the measuring points because, in addition to the process parameters, the measuring point information was also stored and labelled at the factory. The position comparison of the sensors also took place via the graphic display using the "Quick Setup" as well as the easy-to-understand and self-explanatory menu navigation. This enabled the customer to put the differential pressure transmitter into operation quickly, without spending a lot of time reading the operating manual.



Well backlit:
The display of the
OPTIBAR DP 7060 C

5. Product used

OPTIBAR DP 7060 C

- Differential pressure transmitter with integrated measurement of the static pressure
- Unique 3D-linearisation of the signal converter
- Comprehensive diagnostics and configuration
- Can be used in hazardous areas (Ex ia, Ex d) and safety instrumented systems (SIL 2/3)



Contact

Would you like further information about these or other applications?
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