

**SWAN Backpressure regulator and distribution module
Design concept and installation philosophy - FAQ**

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Introduction

This paper addresses frequent questions related to the installation of the SWAN backpressure regulator and its integrated sample distribution block.

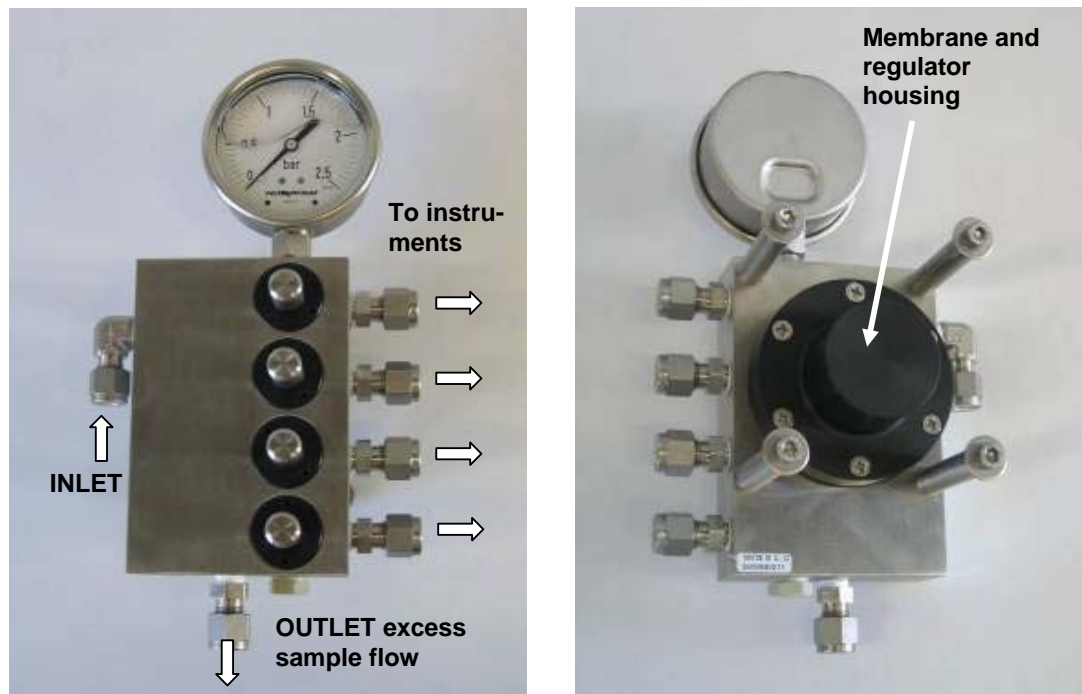
Design philosophy

The Swan backpressure regulator is a device that was designed for the specific needs of water/steam sampling and analysis. The boundary conditions set by the application are the following:

- Online instruments require only a low but constant feed pressure of the sampled water.
- A low back-pressure regulator pressure is an advantage in sliding pressure operation. Refer to Technical note "TechNote_BPRV-hydraulics" for a detailed explanation.
- To ensure stable regulation of a low pressure, the regulator has to be located close to the instruments to minimize pressure losses on distribution lines to the instruments
- In general there are 1-4 instruments on a sample line. For each instrument the sample branches off from the main sample line
- To ensure safe pressure conditions for instruments at all times, the BPRV should not be sensitive to particles and should be able to evacuate large sample flows (at least 5 times the rated cooler capacity)

To meet the above requirements, the SWAN backpressure regulator includes the following features:

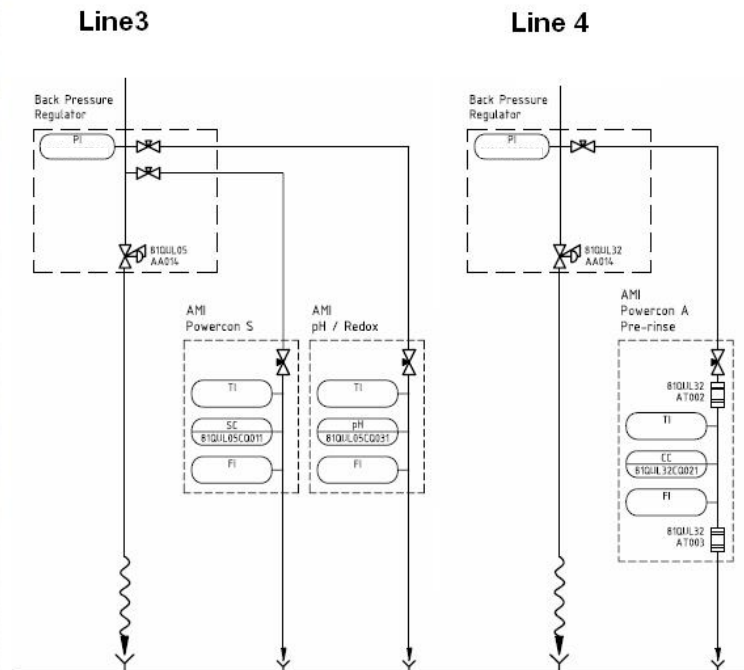
- Diaphragm regulator with fixed set point of 0.5bar
- Large regulator valve cross section to avoid clogging by particles and allow large excess sample flow (up to 500l/h) without significant increase of backpressure
- Integrated distribution channels for up to 4 instruments / grab samples.
- Gas tight membrane valves distribution valves to prevent contamination of sample with ambient air
- Pressure gauge (optional) indicating regulated pressure



Swan backpressure regulator with integrated distribution block – front and rear view

Installation

In combination with the SWAN monitors, the SWAN BPRV is installed on the instrument side, below the instrument panels, on the left side of a group of instruments for a given sample line. The distribution lines are then routed from left to right from the backpressure regulator to the individual instruments. This leads to a very readable arrangements.



Example of SWAN Backpressure and monitor arrangement for 2 sample lines

Frequently asked questions

Why is there no individual KKS number for the pressure indicator, the regulator and the distribution valves?

- The SWAN backpressure regulator is a standardized functional block with a compact and systematic arrangement of the individual functional elements. As the elements are always in the same position relative to each other, there is no need to identify them individually. The common practice is to give the module a single general valve KKS extension such as AA####.
- There is no space to attach KKS labels sub-components
- The valves on the back-pressure are not required for daily operation: they are used to isolate an individual instrument (ON/OFF function only) in case of maintenance / replacement. The sample pipe routing from the valve to the instruments is short and clearly readable – no need to re-identify the small valves on the BPRV block.
- For the operator, the Swan BPRV is only available as complete unit for replacement. SWAN Systeme AG will recondition old BPRVs at factory if required.

Why is there no isolation valve for the pressure gauge?

- The pressure gauge indicates the regulated pressure of the sample valve (normally 0.5bar), not the full line pressure. It is located, just as all components downstream of the temperature protection valve in the low pressure section of the sample piping.

- The gauge reading does not need to be precise (an error margin of +/-15% will have no influence on the process and on the function). Therefore this manometer does not require periodic calibration.
- Even if a calibration or replacement of the pressure gauge was required, it is easy to shut-off a sample line for 1-2 minutes for the time of the replacement of the gauge.
- There is physically no space to fit an isolation valve between BPRV and pressure gauge. The gauge would be obstructing the instrument section (see picture below). Mounting the BPRV in a lower position would generate unnecessary customization cost
 - Custom mounting plate for BPRV,
 - Custom sample pipes from BPRV to instruments
 - Modification of standard BPRV – special handling for assembly, documentation and spare part handling

Why can the pressure gauge not have a larger diameter than 63mm?

- Gauges with larger diameters will no longer fit in the standard installation. They will obstruct the instrument section (see picture below)
- Gauges with diameter >63mm can not be disassembled without removing the complete BPRV block
- The requirement for pressure gauges >63mm applies in general to field indicators installed directly on process pipes. For sampling system pressure gauges in the LP area, this requirement is out of context.

