JCT Gas Sampling

Sample Gas Conditioning You Can Trust

Sampling Systems

for CEMS and Process Applications

JCT Analysentechnik

a member of JCT GROUP

Continuous Emission Monitoring System (CEMS)

Industry Sectors	Gases
• Chemicals	• NO / NO_2
• Pharmaceuticals	• O_2
• Food & Beverage	• SO_2
• Automotive	• CO / CO_2
• Oil & Gas	• org. C
• Power & Energy	• H_2
• Petrochemicals	• H_2S
• Pulp & Paper	• HF
• Incinerators	• NH_3
	• Cl_2
	• HCl
	• COS

Process and waste gases mostly contain dust and water vapour at high temperatures of up to 2,000 °C. They also can contain corrosive, toxic, sticky or sooty components, can be explosive, under elevated pressure or can resublimate when cooling (immediate transition from gaseous to solid phase). Also a combination of several or even all mentioned conditions is possible.
Should nevertheless these gases be analysed regarding concentration of certain components all possibly above mentioned conditions have to be considered for an error and failure-free analysis.
This happens in different reasonable interconnected conditioning steps to feed a clean but nevertheless authentic sample gas to the analyzer at the end of the measurement chain and so getting a precise representative reproducible measuring value without the analyzer being damaged. Because gas analysis usually is carried out continuously 24 hours a day, gas conditioning has to take place during the whole day too. The challenge now is to design a gas conditioning that allows a continuous error-free gas analysis with the least possible maintenance effort.

JCT Analysentechnik GmbH has experience in this field for more than 30 years and has built and delivered countless reliable working gas analysis systems for customers worldwide. The self-developed and produced single components for gas sampling and gas conditioning are optimised for this demanding tasks and represent because of the variant diversity a modular system with endless solution possibilities.

Features

- Complete turnkey solutions from engineering via gas sampling probe to the analysis cabinet
- Gas sampling and conditioning optimally adapted to the process conditions
- Individual design in consideration of customer guidelines, company standards and all other relevant standards
- Optimum accessibility of all components
- Optimum protection of the analyzers
- Exclusive use of premium components and materials
- For in- and outdoor installation also with air conditioning
- Complete documentation
- System installation or supervision of the erection as service
- Comissioning as service

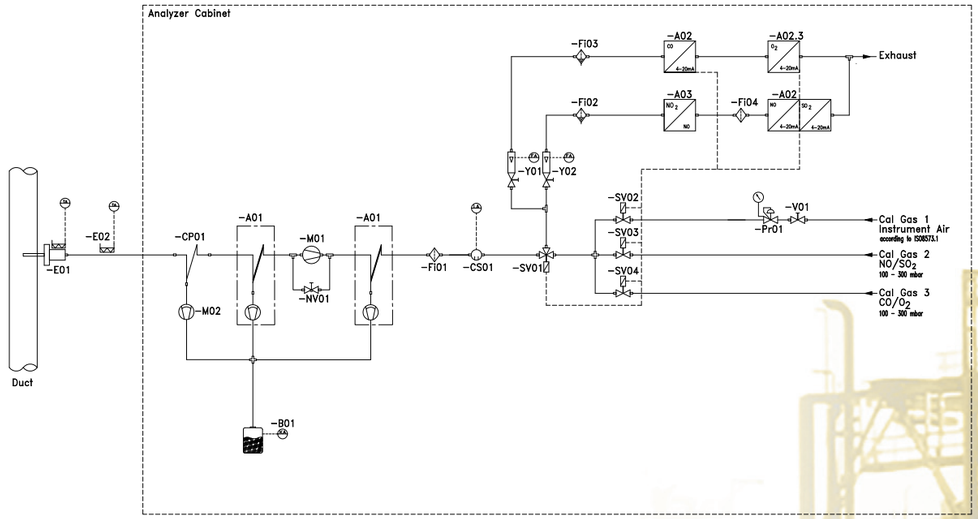
Benefits

- Ready for immediate use
- A long time precise reproducable measuring results
- True measuring values
- Reliable failure free operation
- Optimum operational safety due to selfmonitoring
- Low maintenance
- Simple operation
- Easy to maintain design
- Long lifetime

Applications

- For continuous extractive gas analysis
- For emission and process monitoring as well as process control and optimisation
- Continuous measurment of gas components of gases like e.g. NO, NO_2, SO_2, CO, CO_2, O_2, org. C, HCL, H_2, H_2S, HF, NH_3, CL_2, COS, ...

Sample Gas Preparation



Sample Conditioning

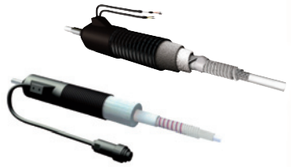
In the analysis cabinet or container connected to the gas sampling there are located all further sample gas conditioning components, devices, fittings, pumps, and analyzers. In the gas flow diagram of an emission measuring system shown on the next page these are e.g.

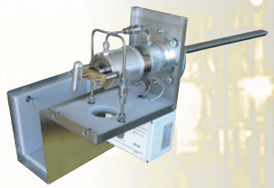
- Pre-cooler (CP01) and sample gas cooler (A01) with condensate pumps (M02) and collecting vessel (B01) for specific removal of the water vapour
- Sample gas pump (M01) with bypass needle valve (NV01) for suction and transport of the sample gas and for adjustment of the sample gas quantity
- Sample gas fine filters (Fi01 and Fi04) as well as safety filters (Fi02 and Fi03) for removal of dust residues and for protection of the analyzers
- Liquid alarm sensor (CS01) for protection of the analyzers against condensate, because in case of alarm the sample gas pump is switched off
- Solenoid valves (SV01–SV04), pressure regulator (Pr01) and shut-off valve (V01) for calibration gas feeding
- Flow meters (Y01 and Y02) with flow monitoring for adjustment and monitoring of the flow rate
- Analyzers (A02, A02.3 and A03)

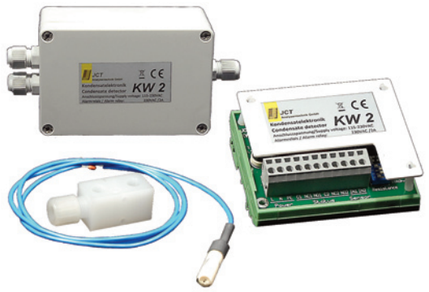
Gas Sampling

Gas sampling happens with gas sampling probes (heated filters) (E01) to prevent condensation of e.g. water vapour and therefore bonding of dust and condensate. Corresponding to the above mentioned possible sampling conditions there are different gas sampling probes that can be adapted to the above mentioned possible sampling conditions with extension options like e.g. back purge facilities, separators, and a variety of sampling pipes and pre-filters.

To transport the now dust-free sample gas from the sampling point to the real gas analysis system without condensation of water vapour, heated sample lines (E02) are used. This prevent dissolution of water soluble gas components in condensate as well as freezing of outdoor installed lines in winter.







Safety

In gas analysis systems the temperature alarm contacts of the gas sampling probe, the heated sample line, the sample gas cooler, and the condensate monitoring are linked in a safety circuit, so that in case of alarm or voltage breakdown of the respective component(s) the status is signalled and the sample gas pump is stopped automatically to prevent damages by condensate and forming acids. Additionally a liquid stop can be installed to prevent reliably damages of the analyzers in case of condensate breakthrough.

Analysis Cabinet

The typical analysis cabinet for in- or outdoor installation is a steel or FRP-cabinet with 19” (swing)frame for installation of analyzers as well as the control and operating panel. Energy distribution to the single devices is contained in the analysis cabinet and built on a mounting plate. Other executions as e.g. analysis container, wall mounting housings, mobile systems or complete constructions on mounting plates are also usual. Also heated housings with conditioning components and fittings for “hot gas measurements” may be integrated.

For signalling of the analysis system status e.g. alarm and status messages for failure, calibration or need for maintenance of the analyzer, temperature alarms of gas sampling probe, sample gas cooler, condensate alarm, flow alarm, and service switch are provided as volt-free contacts.

DESIGN OF A GAS ANALYSIS CABINET (example)

- Internal energy distribution to the single devices
- Fault current circuit breaker
- Analogue and binary delivery signals on terminal strip
- Alarm and status LEDs
- Cabinet lighting with door contact switch
- Service socket
- Fan and filter unit (thermostat controlled)
- Air conditioning

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