

DESIGN REPORT

LD20-01



COMPACT STREAM SELECTOR SYSTEM FOR TRACE IMPURITIES ANALYSERS & SENSORS



A quick response time is what is required when its time to talk about gas analysis. Having the right analyser with the proper detection technology is in the scope to be sure the analysis time is short, and the results are stable and accurate. But it is very important to understand that the most critical component when its time to look at the response time and the stability, is the sampling system (also called stream selector system).

OUR SOLUTION

The LDGSS sampling system has been designed for any type of applications when switching from different streams and different calibration gases is required. The system is 19" rackmount (3U size) offering one of the most compact sampling systems available on the market. It can be configured for 3 to 10 streams depending of the requirements. The system has its build in fast loop sample bypass adjustable rotameters mounted on its front side. These rotameters are used to adjust the desired sample bypass purging flow for each of the stream. The scale of these rotameters is changeable depending of the application.

The device can be controlled locally by using the front rotary switch available on the face panel. It can also be controlled remotely by a DCS using the remote contacts available on the back-panel connector.

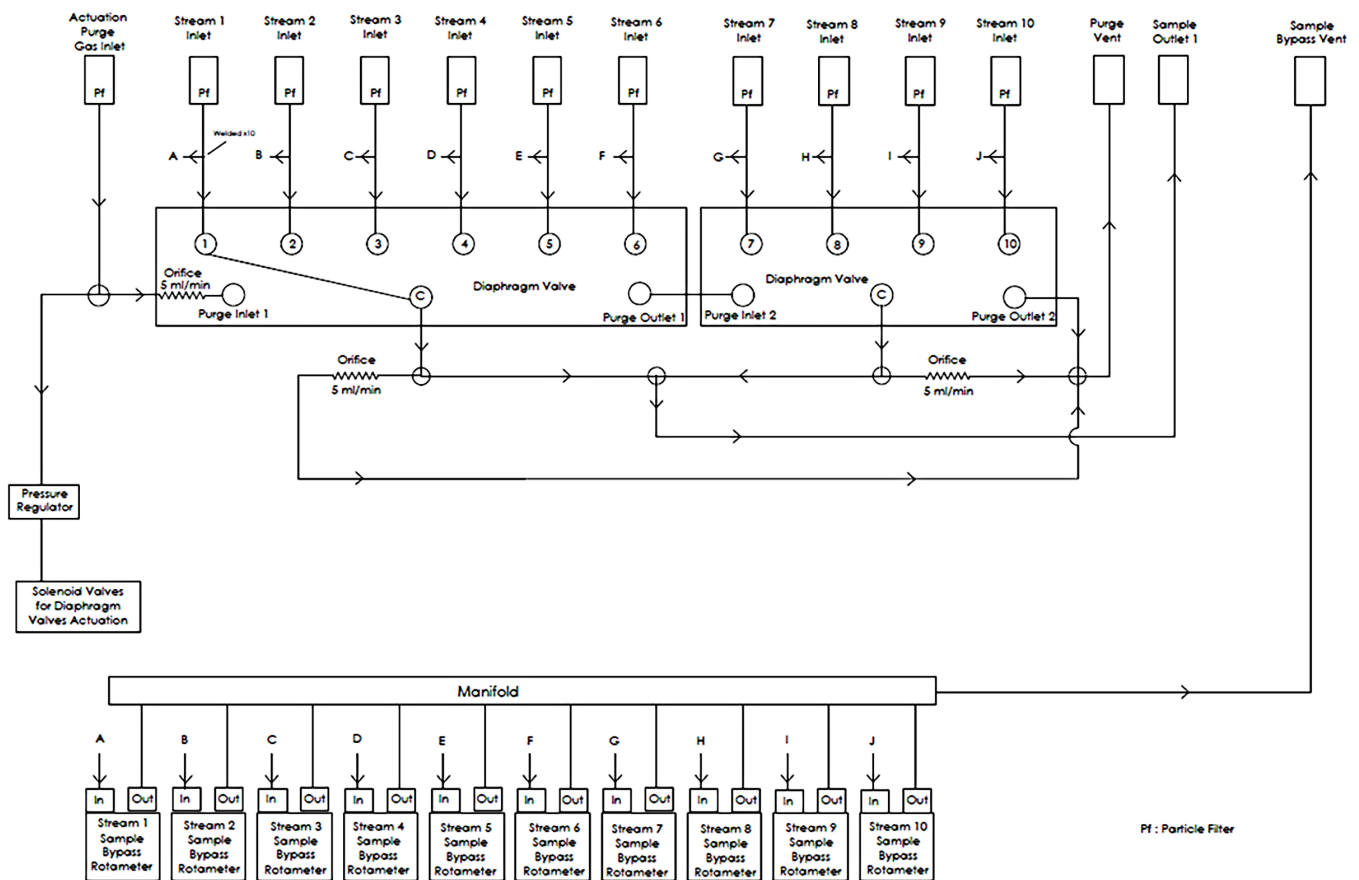
The flow path has been designed in a way that the sample flow of each stream is in constant purging even if it is not selected to avoid any dead volume (gas pockets) always resulting in response time delay and spikes. Refer to the two diagrams showing the internal flow path configurations.

LDGSS DIAGRAM WITH PNEUMATIC DIAPHRAGM VALVES

The diaphragm valve version is employed here to ensure keeping the air diffusion contamination below 0.1ppb based on the nitrogen impurity at low pressure/low flow rate (a way better than conventional 1×10^{-9} atm cc/sec Helium leak rate). Such design is required when ultra high purity is necessary. The valve is made of 316L stainless steel and have an inert diaphragm that ensure a perfect sealing. The valve actuation pressure required here is 65psig and is regulated by the internal pressure regulator.

An internal purging groove ensure to avoid any risk of air diffusion coming from outboard leakage. That is a critical parameter when low trace impurities are required. All the piping connections in the device are welded to eliminate the risk of contamination. When fittings are required to make a gas connection internally, our LDetek series single ferrule type are used to avoid any miniature pocket of gas generally present when a standard double ferrule is employed. For the external gas connections with the different streams and the analysers, the version face seal (VCR) or compression type can be used in different sizes. A ten microns stainless steel particle filter (frit type) is mounted in each gas connection.

In case the application requires a special attention due to the aggressivity/instability or the absorption of the gas types and impurities measured, a surface treatment can be added to have an inert and less reactive surface. All piping/fittings and valve can be modified with the proper coating and material.



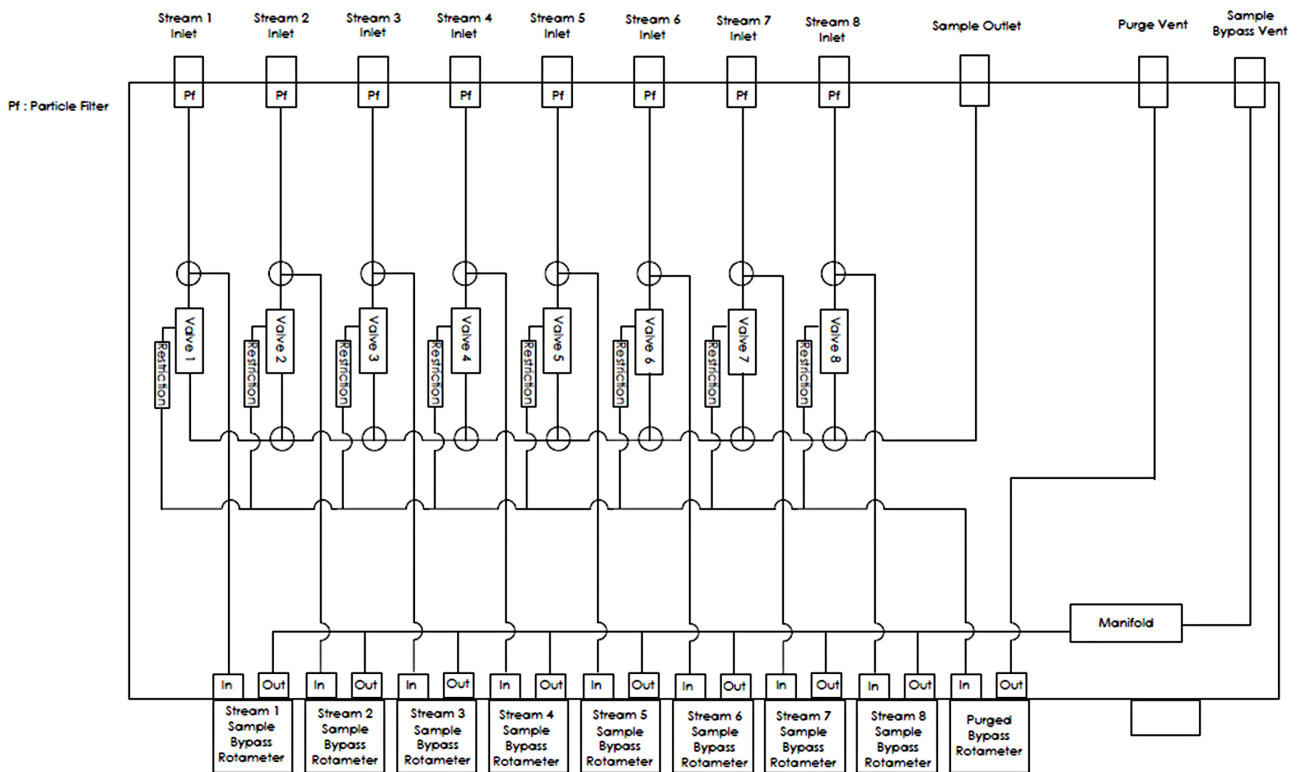
LDGSS DIAGRAM WITH 3 WAYS ELECTRIC SOLENOID VALVES

A generic version of the LDGSSS is available when the limit of detection required for the most present impurities in ambient air like nitrogen and oxygen is over 100ppb. The LDetek, 3 ways solenoid valve offer a Helium leak rate of 1×10^{-9} atm cc/sec. Our leak rate validation methods are the same as the one used for the diaphragm valve series where we used our PlasmaDetek2 patented detector able to measure ppt N₂ in Helium at 200sccm with pressure range being between 2-10psig. Our LDGSS comes with a quality certification where validation of each stream has been performed.

Here again, the unselected streams are in constant purging allowing every stream to be ready for being selected for analysis without having response delay or spike. The purge flow is regulated and maintained by a network of orifices mounted on the normally open port. Such orifice is mounted on each stream for each three ways valve.

The adjustable rotameters play the role of fast purging the gas lines and piping upstream to the unit.

The valve is electric actuated with 12 VDC and is mounted on a 316L stainless steel manifold. The gas connections on the valve manifold are 316L stainless steel 1/16" LDetek single ferrule type. Such fittings eliminate the presence of dead volume.



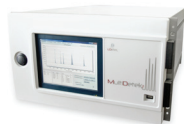
CONNECT UP TO 10 SAMPLE POINTS TO MULTIPLE GAS ANALYSERS AND SENSORS :



Trace Oxygen analyzer
(GPR & PI2 series)



Trace Moisture analyzer
(QMA series)



Gas chromatograph
(MultiDetek2 series)



Trace N2 analyzer
(LD8000 & LD8000MG series)



Trace THC analyzer
(LD2000 series)



O2 sensor
(Senz TX series)



Dewpoint sensor
(Easidew series) ...



990 Monfette Est, Thetford Mines, (Qc), Canada, G6G 7K6
Phone: 418 755-1319 • Fax: 418 755-1329 • info@ldetek.com

www.ldetek.com