Valve Solutions from JAS GmbH

jas joint analytical systems

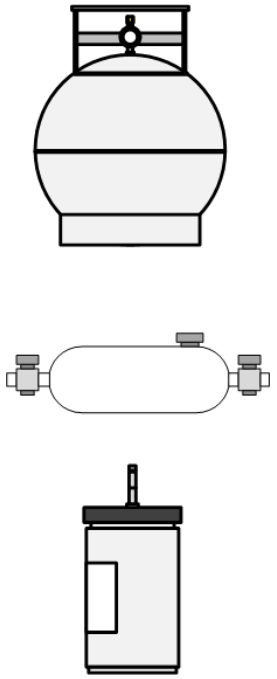
SIMPLY SMART SOLUTIONS

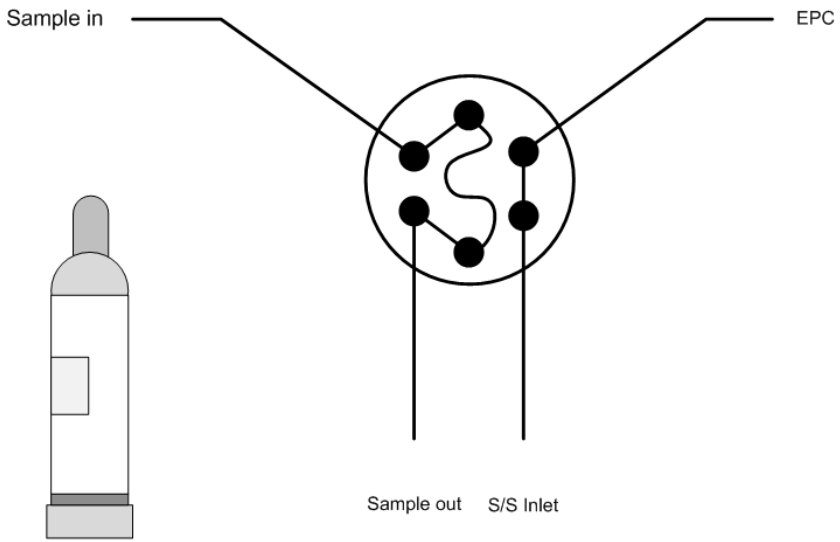
Sampling devices

Gas sampling with high pressure

- Gas sample is dependent on the sample loop pressure

1. Purging the sample path
2. Decompression to normal pressure
3. Injection



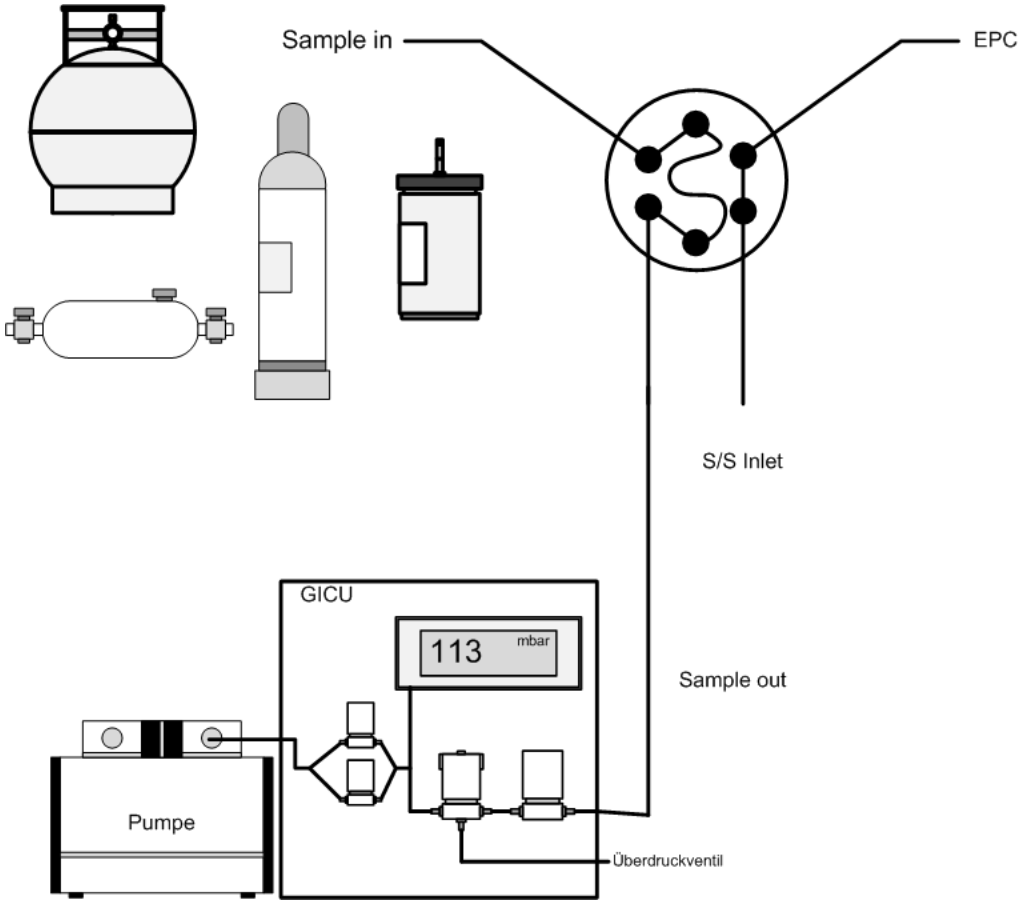


Sampling devices

Gas sampling with normal or low pressure

GICU Sampling unit

1. Filling the sample loop with a pump
2. Adjusting the pressure
3. Injection



JAS GICU

GICU Gas Injection Control Unit

1. Control unit to fill the sample loop for gas applications
   - Mode 1
     - Pressurized Gas sample with positive high pressure
   - Mode 2
     - Gas sample with low pressure (Tedlar bags, gas sampling bulb)
   - Mode 3
     - Bypass sampling (online process, mini plant)

2. Pressure controlled (from 200 to 2000 mbar or 3 to 30 psi)
   - Reproducible pressure give best standard deviation

3. Multi level calibration
   - Sample injection of different pressure gives different levels for the calibration curve

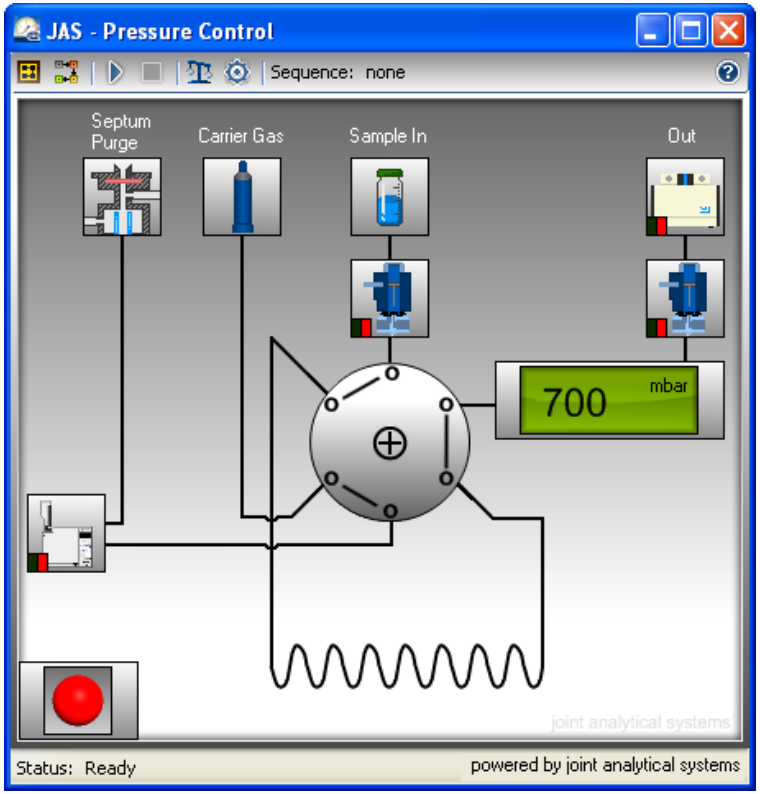
JAS GICU

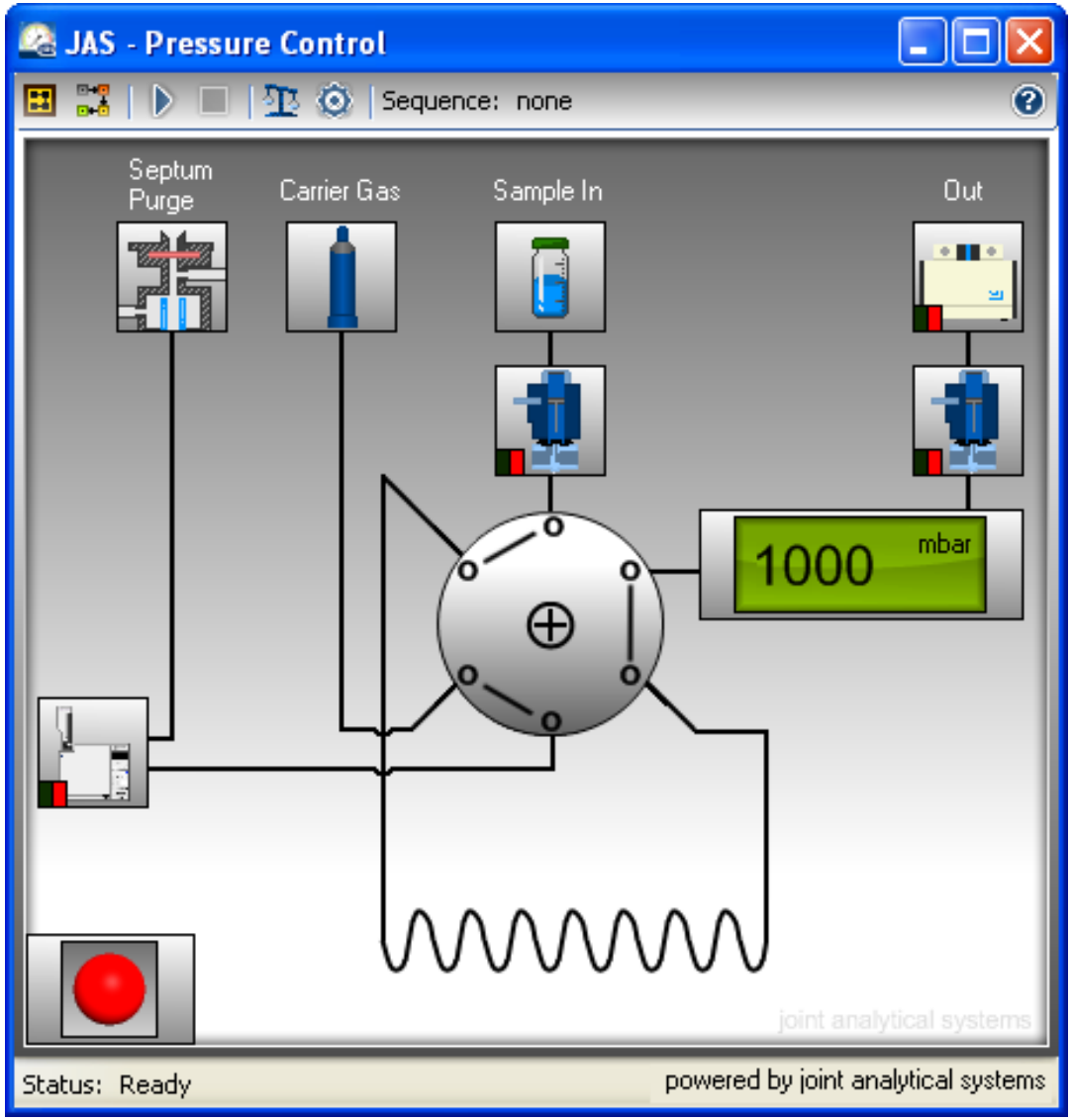
GICU Gas Injection Control Unit

4. GICU Software controlled
   - Time programmed sample loop filling
   - Multi sample loop purging
   - Calibration pressure sensor
   - Control of diaphragm pump
   - Start / Stop signal for the GC
   - Sequence and Method development

GICU Gas Injection Contol Unit

- Software control
- Easy method development
- USB control





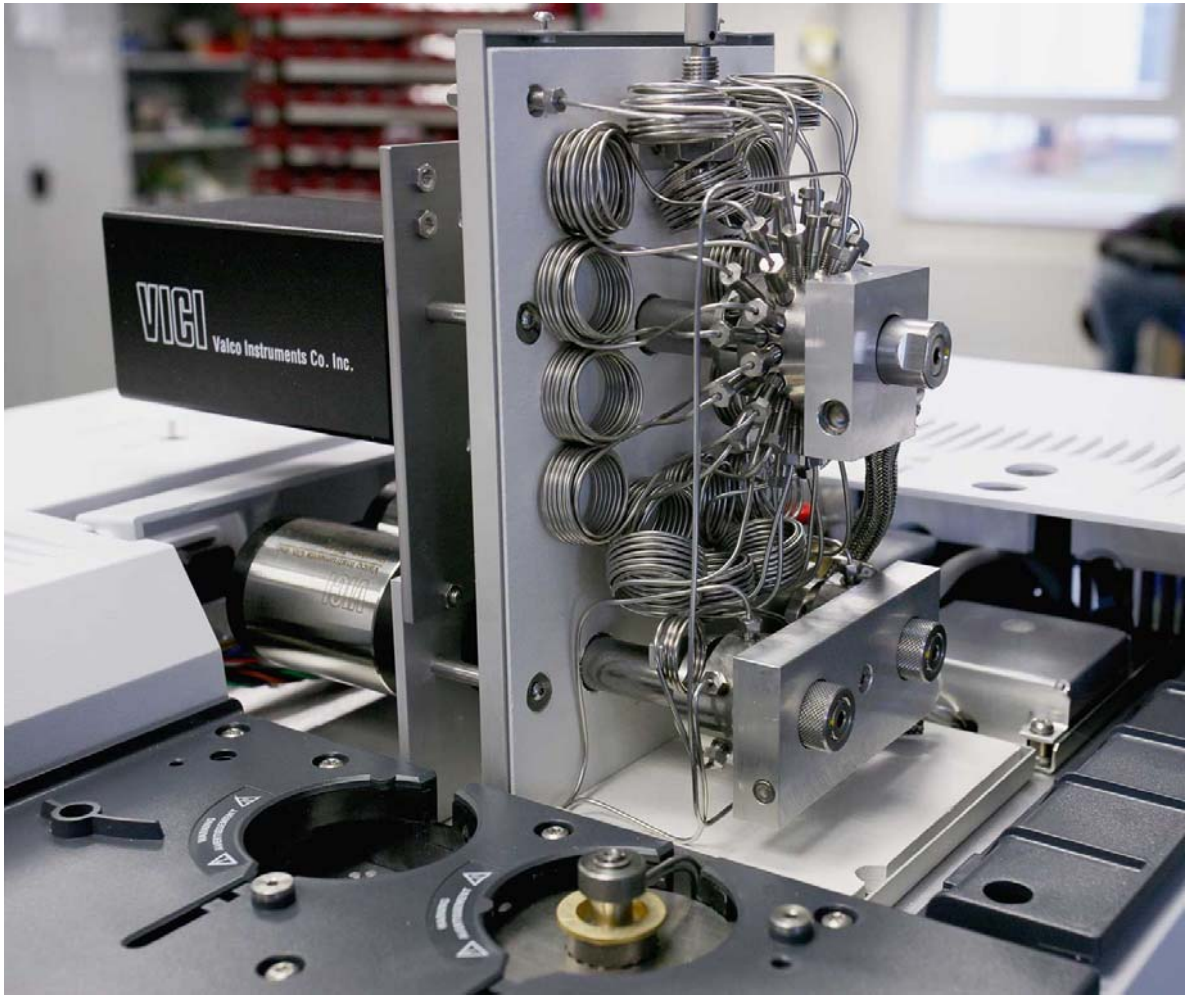
SIMPLY SMART SOLUTIONS

Gas injection with automation

joint analytical systems

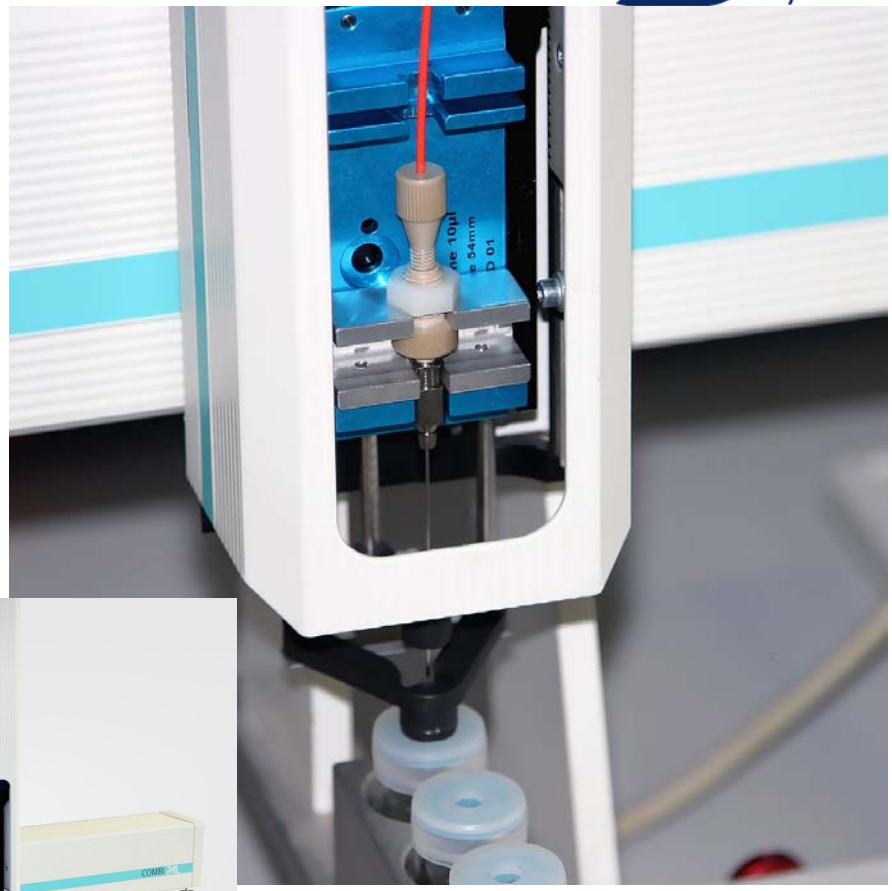
1. Multiposition Valve

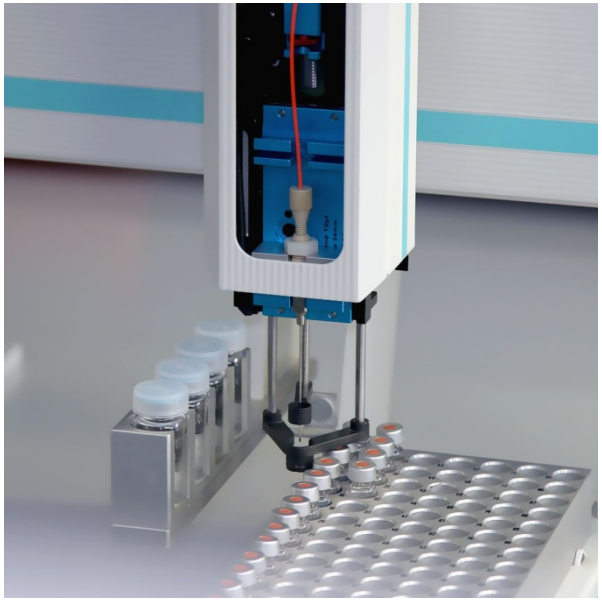
- Up to 16 positions
- Up to 300°C
- Software controlled
- USB/RS232 interface

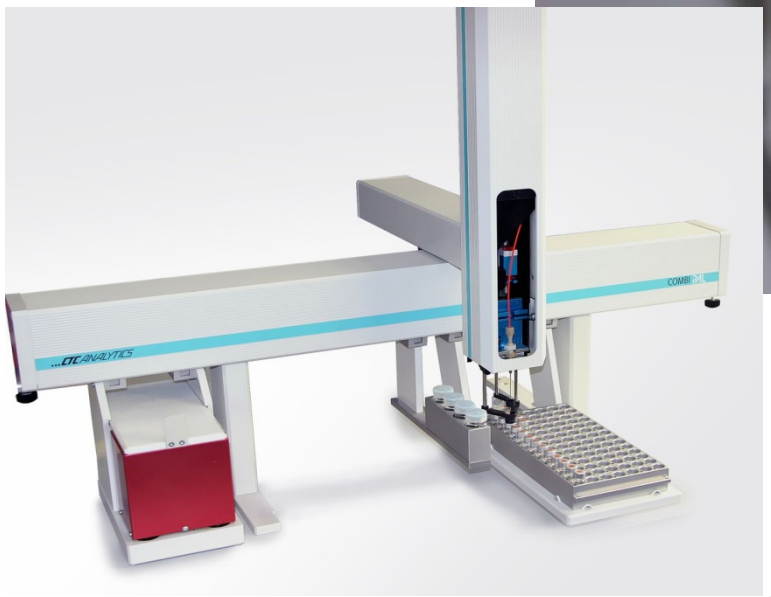


Gas injection with automation

1. CTC Sampler
   - Sample vails
   - unheated
   - Software controlled



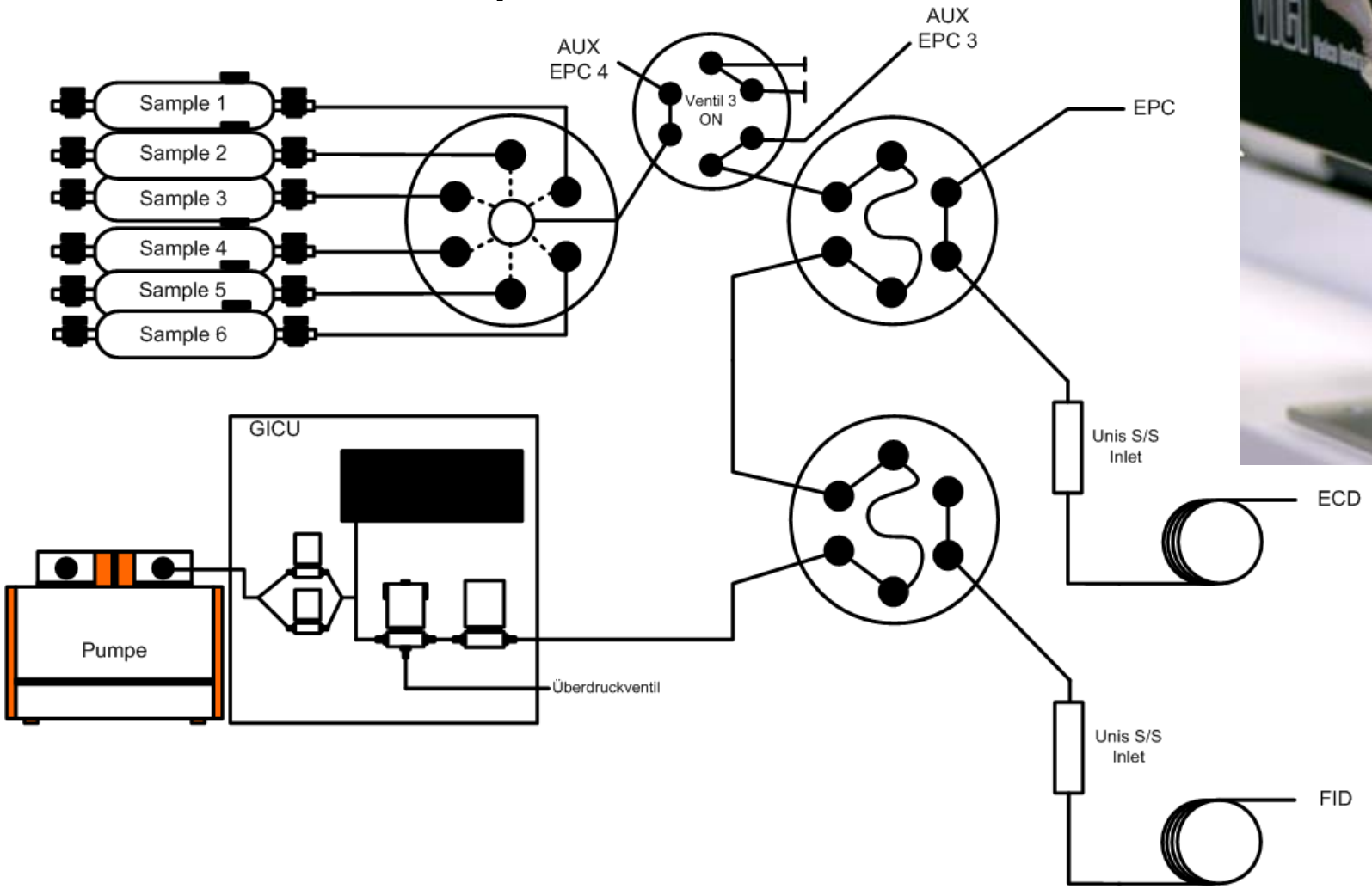


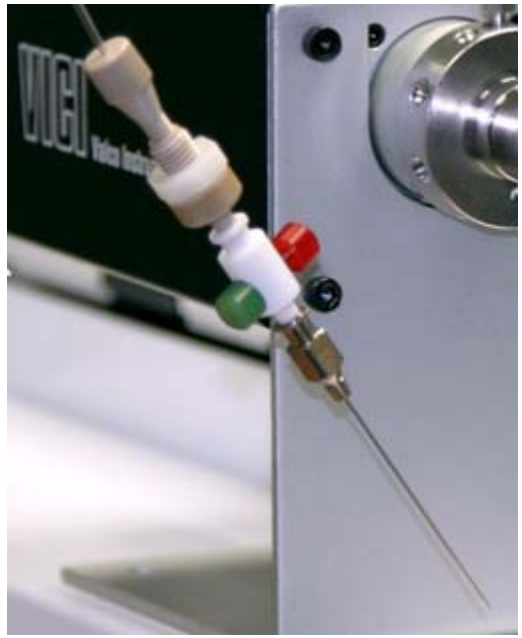


Gas injection with automation

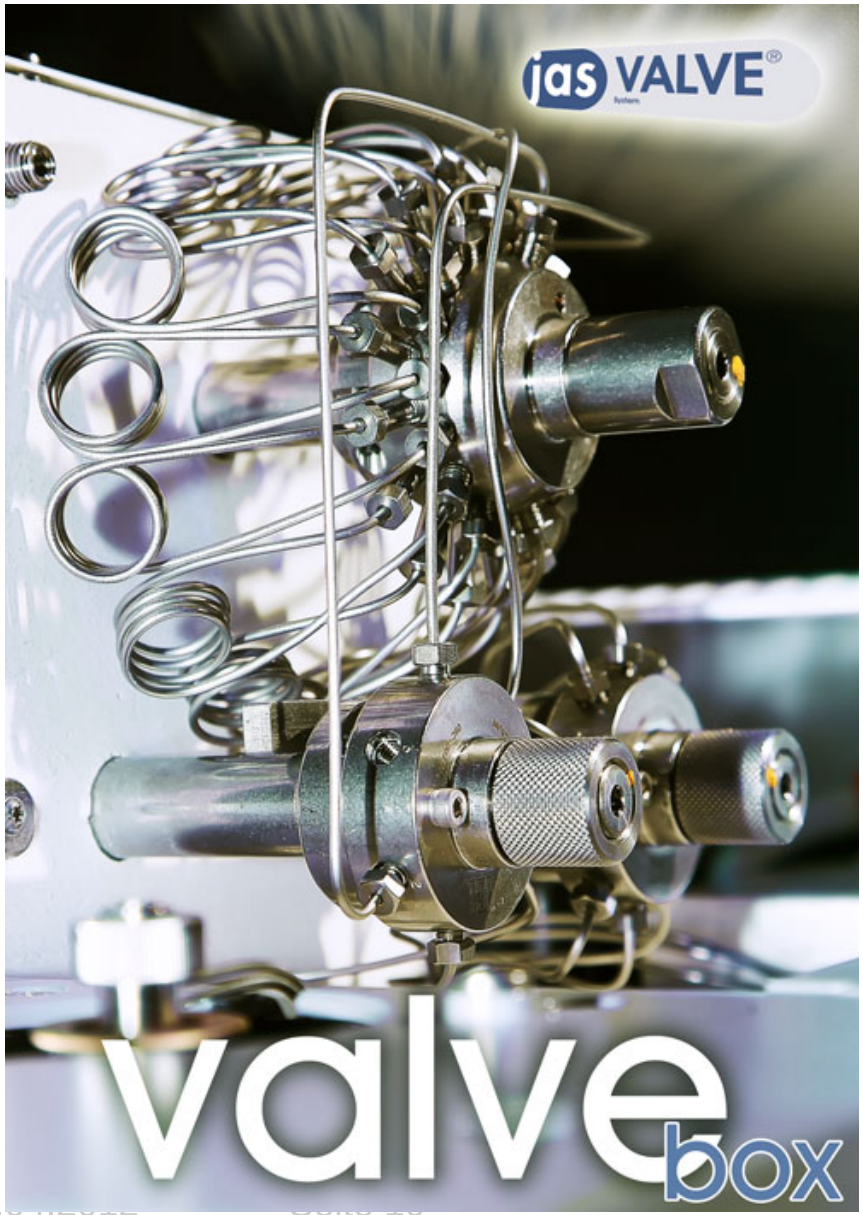
joint analytical systems

Customer example



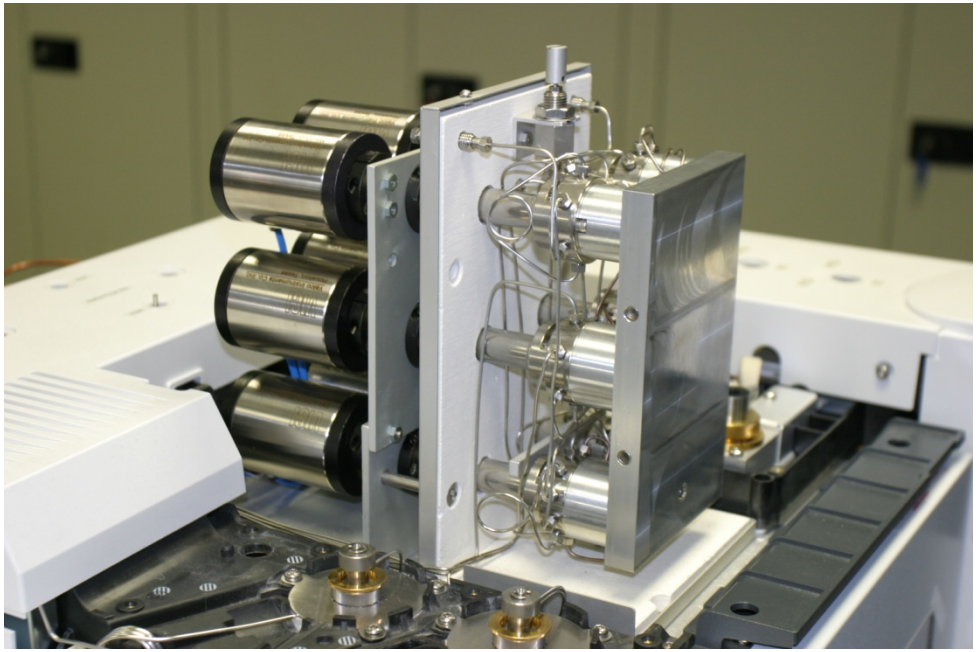


Valve solutions



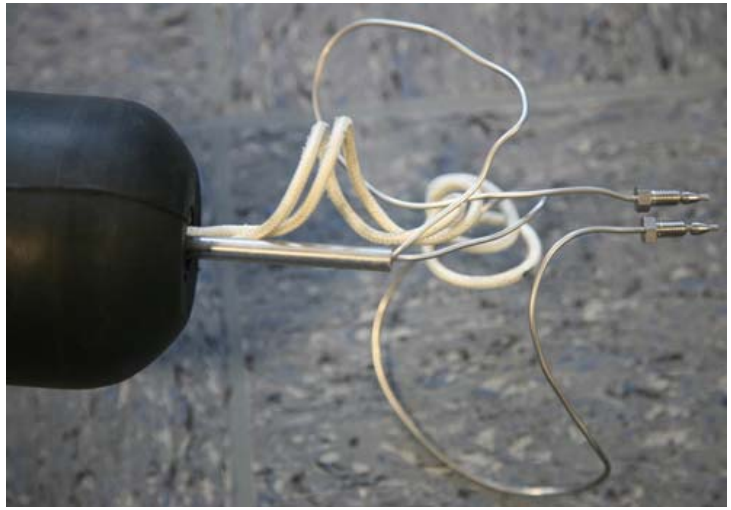
JAS valve box

- Valve box can be configured up to 6 valves
- Valves can be heated up to 300°C
- Valves are available deactivated (sulfur compounds)
- Multiposition valves are integrated



Heated valve solutions for online applications

- Heated transfer line
  - Up to 6 line direct to the GC
  - Max. 300°C
- Ex proof transfer line
  - Available
  - Up to 20m
  - Up to 6 line direct to the GC
  - Max. 300°C

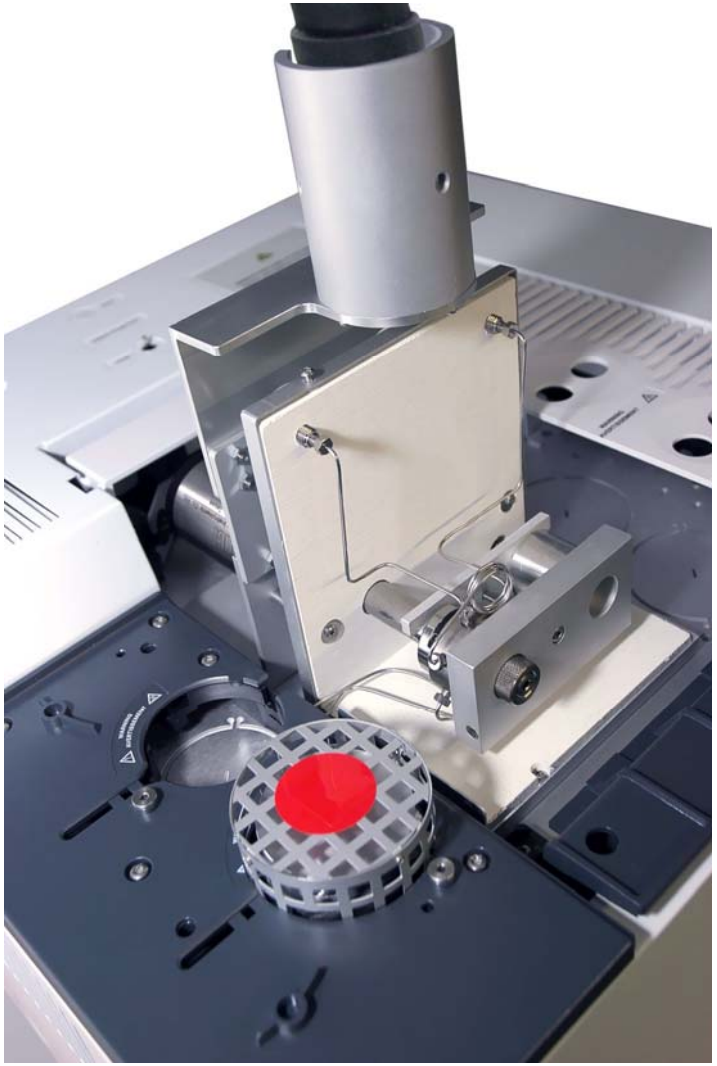


Heated valve solutions for online applications

- Examples

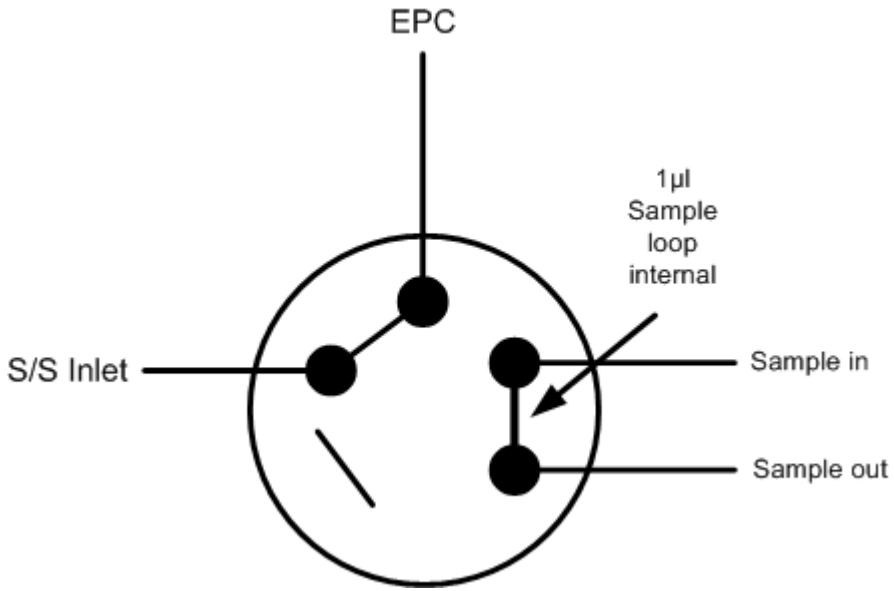
Heated valve solutions for online applications

- Example with GICU



Liquid gases and the solutions

- Liquid gas
  - CO2, LPG, Propane and so on
    - High pressure



Liquid gases and the solutions

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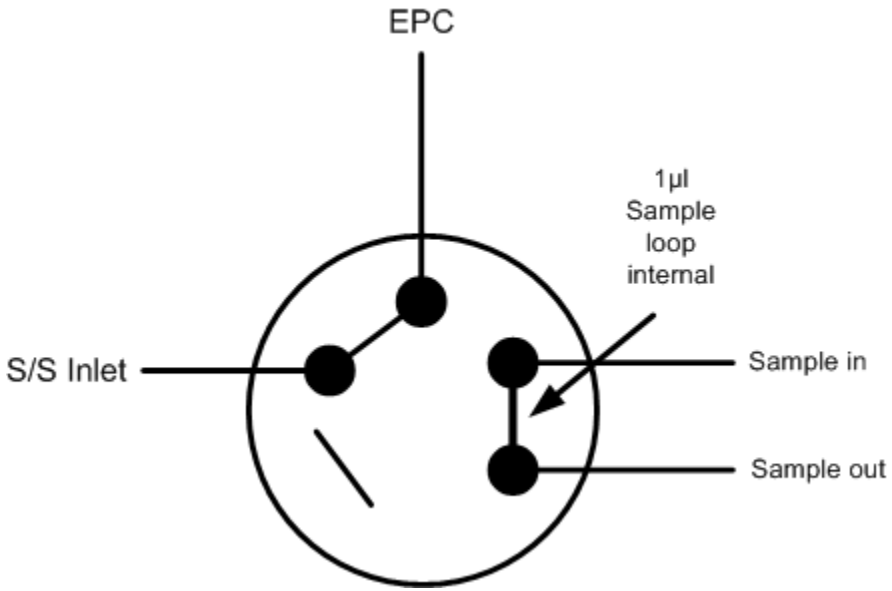
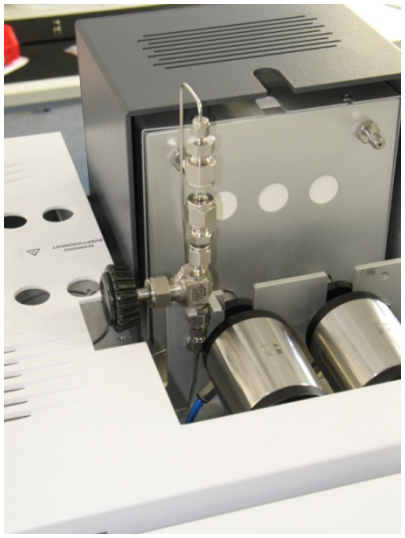
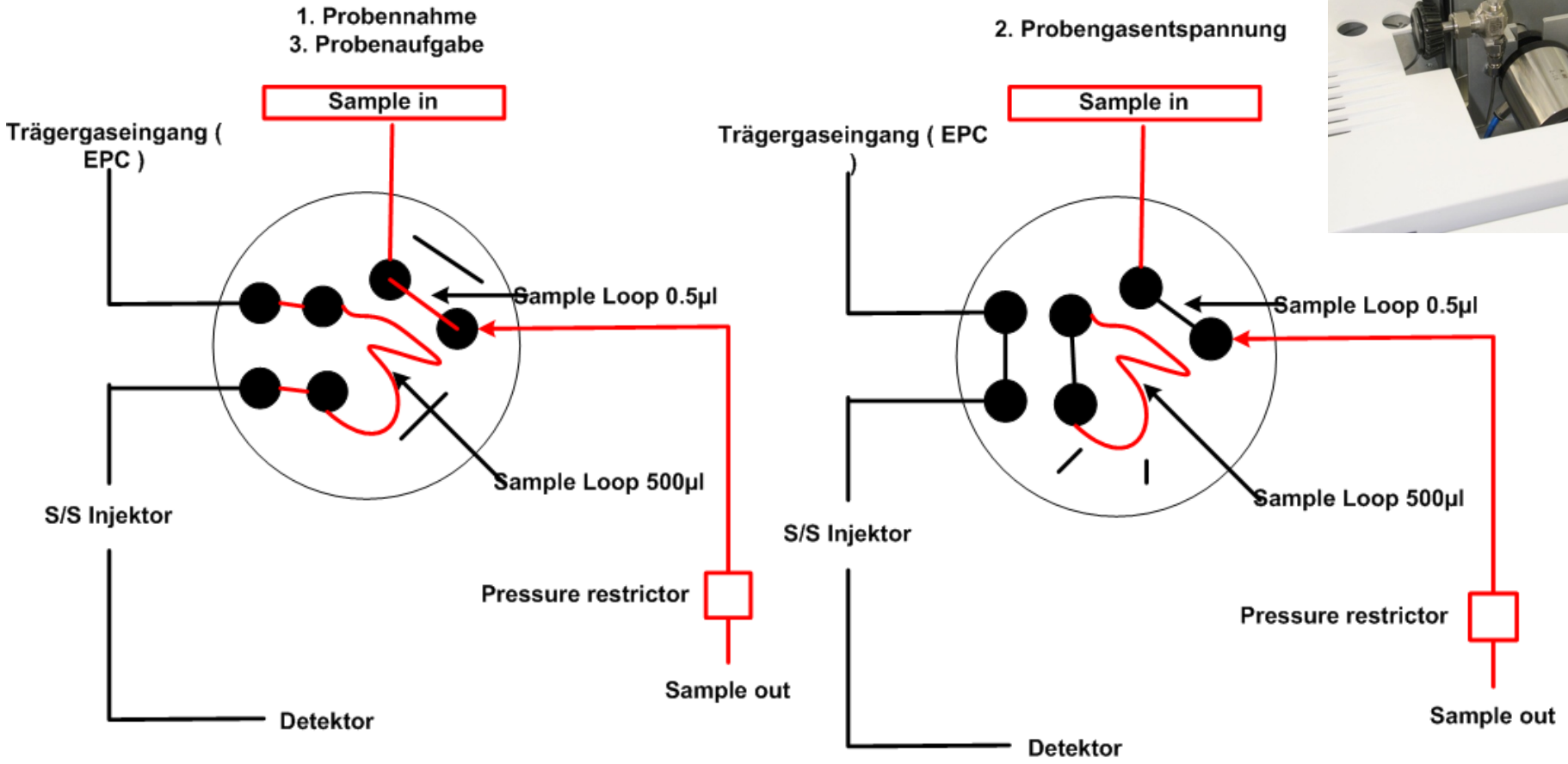


Liquidgas injection automated with special valve

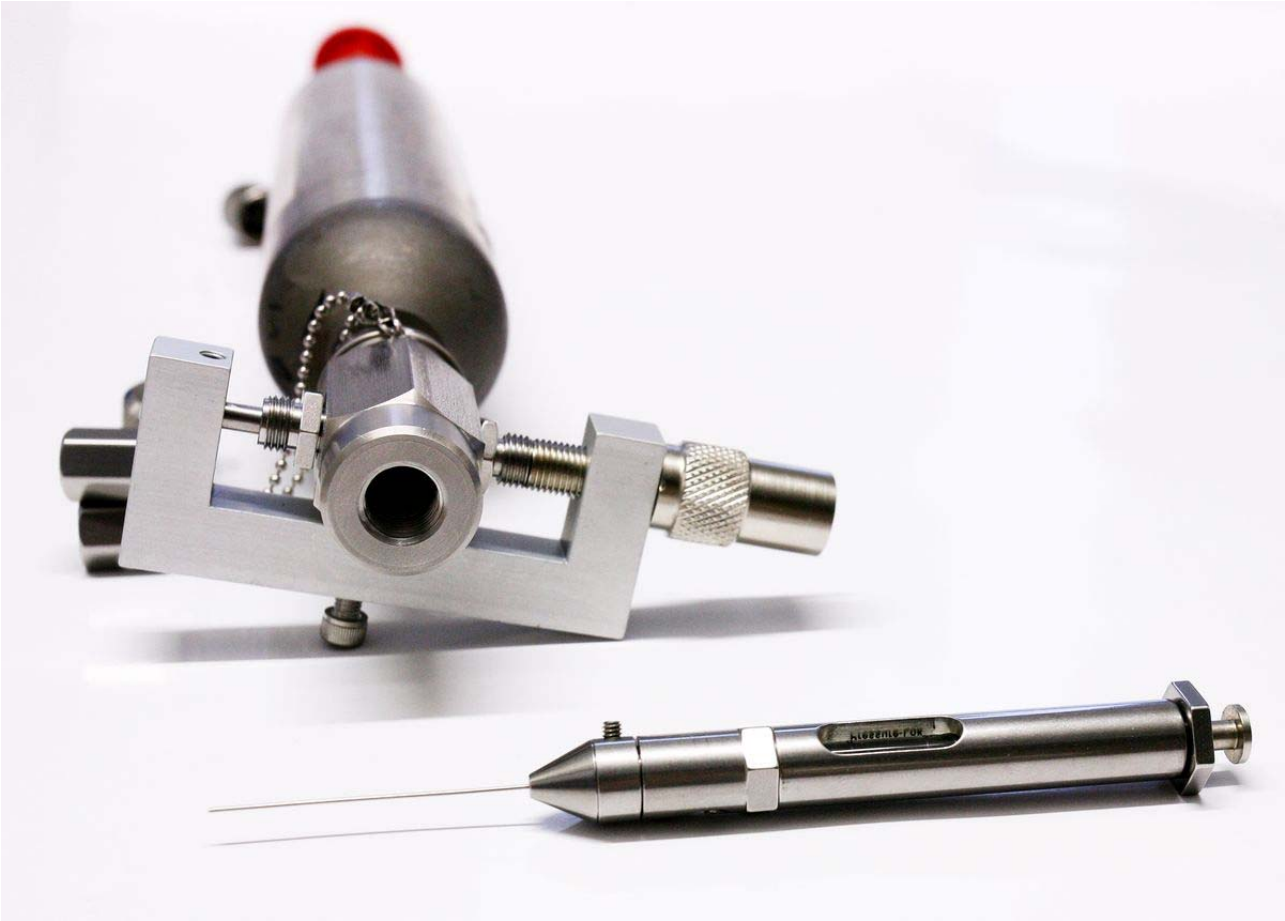
- Liquid gas valve (useable up to 175°C)





Liquidgasinjections with syringe

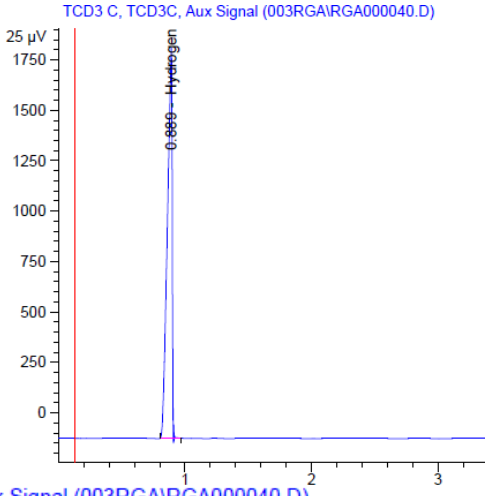
- Liquidgassysringe
  - useable up to 35bar
  - Sample size 0.5-5µl
  - complete system
    - syringe
    - adapter

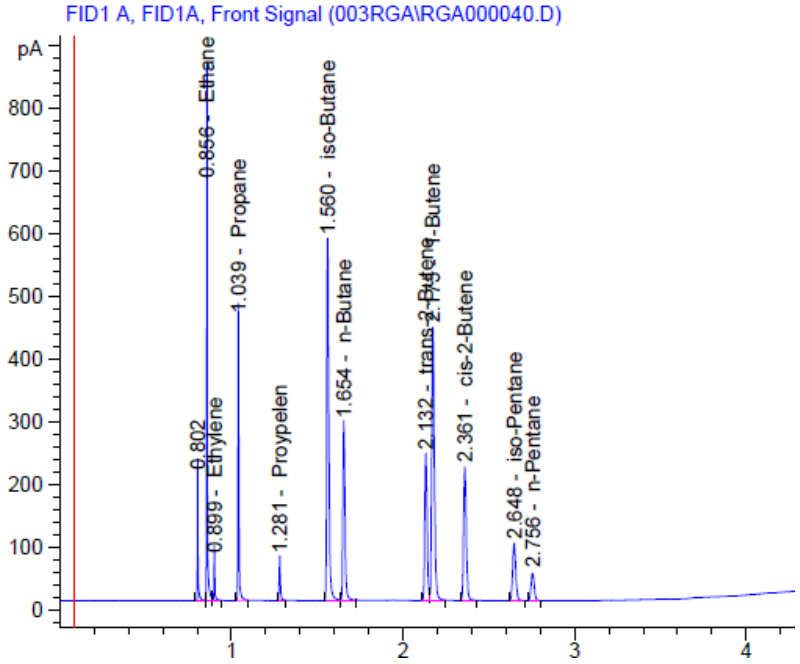


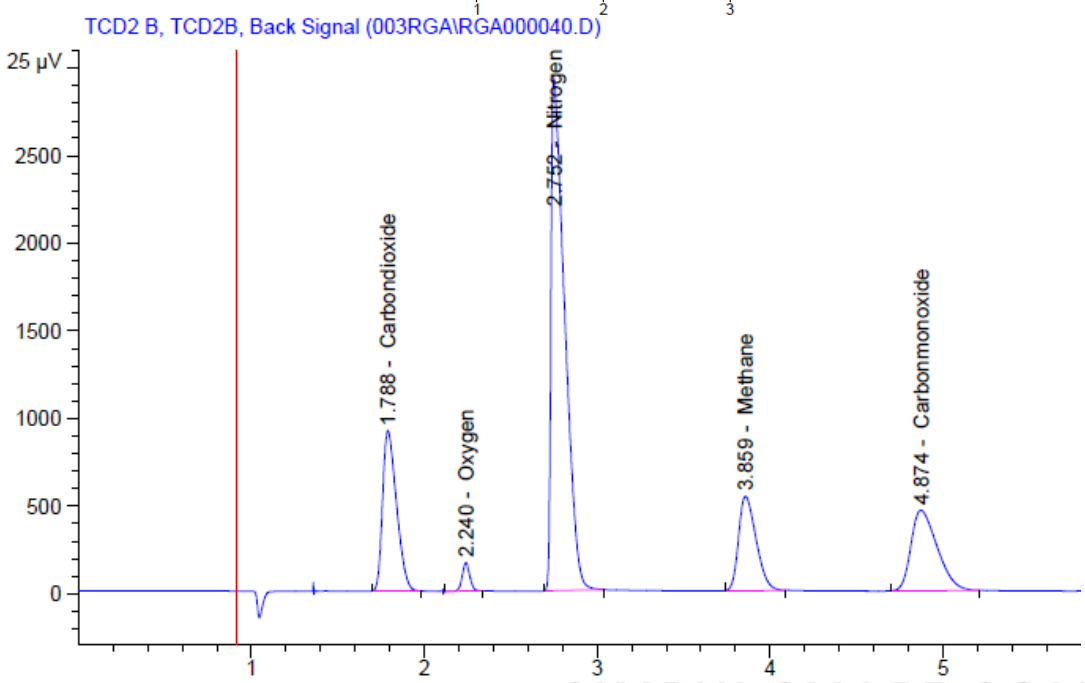
JAS Valve Analyzer

MACH-RGA Analyzer

2. JAS BTU Calculator Software
3. Additional Option for LPG
4. Additional Option for Trace CO/CO2
5. Example

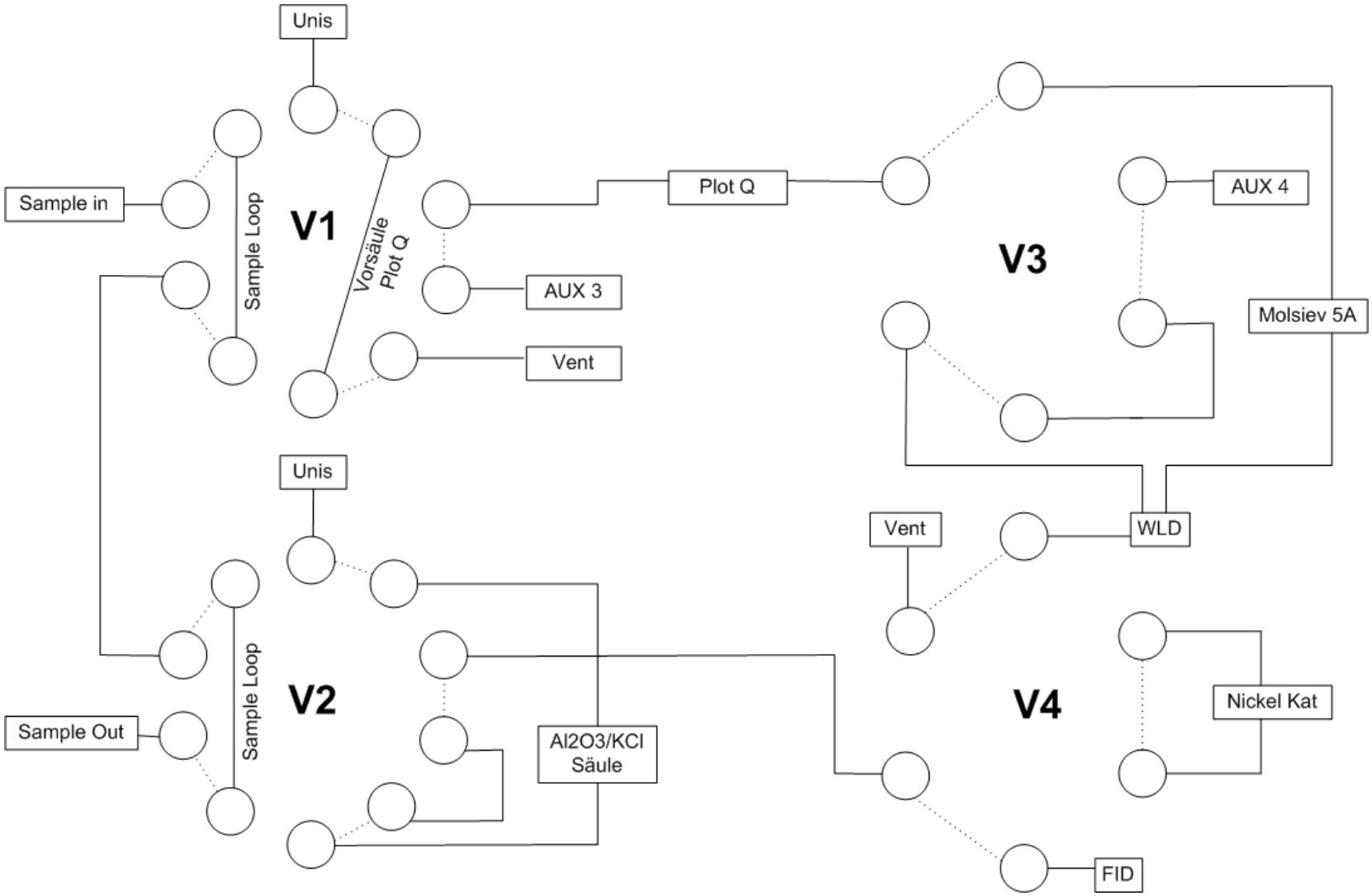






Example JAS NGA

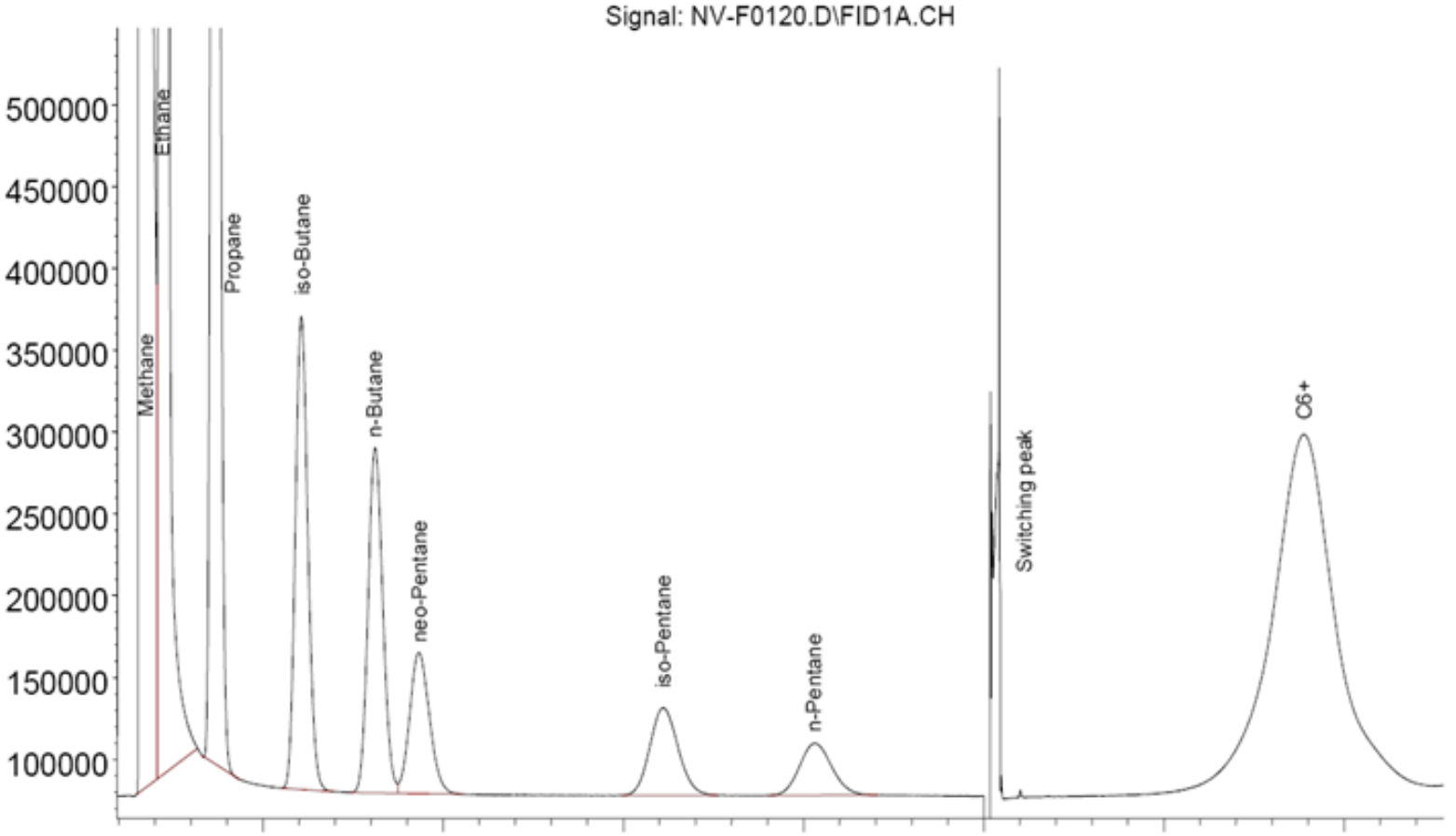
- JAS NGA – Valve Configuration



Example JAS NGA

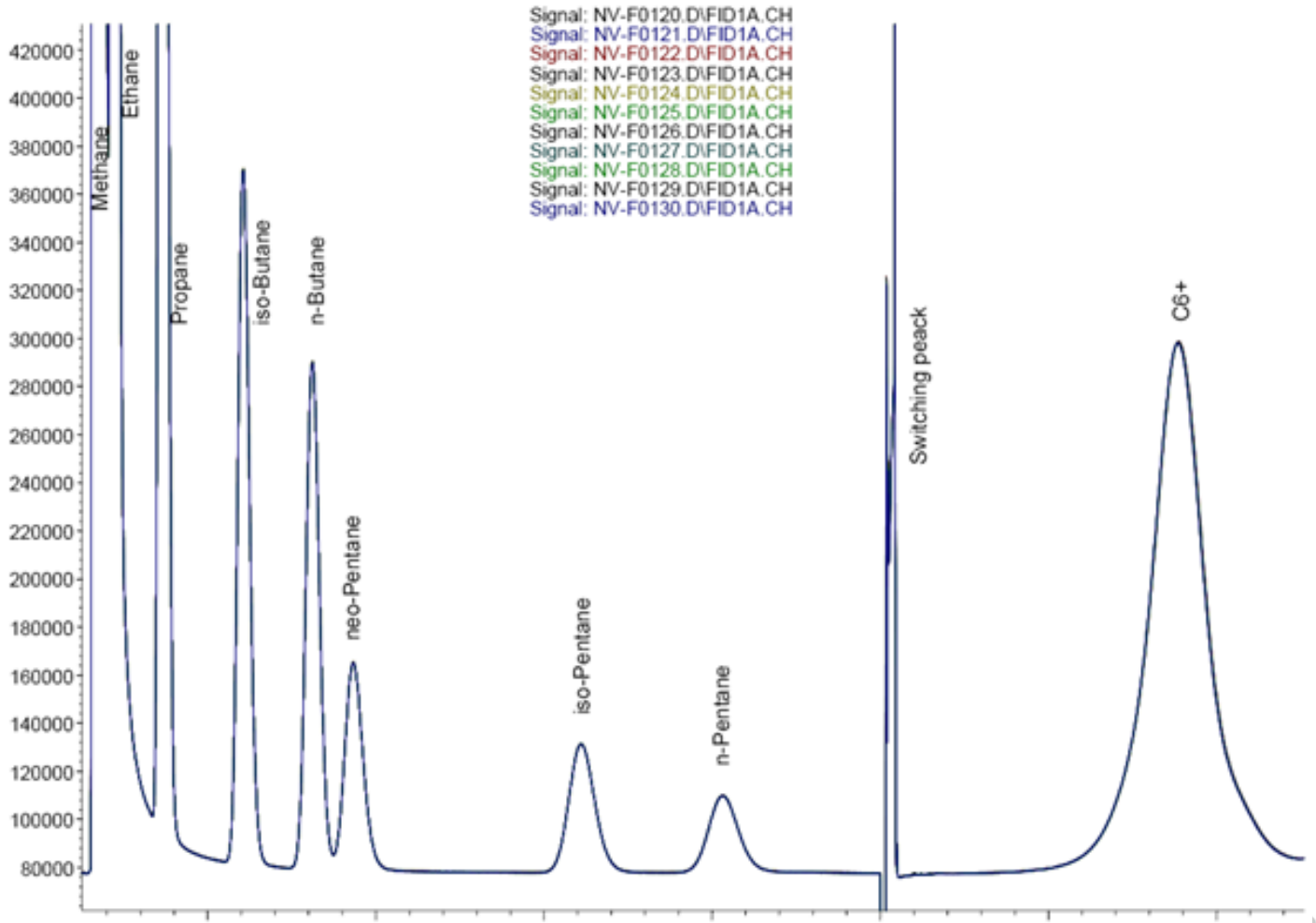
- Hydrocarbons (C1 – C6^{+}) with FID

  - Components: Methane, Ethane, Propane, iso-Butane, n-Butane, neo-Pentane, iso-Pentane, n-Pentane



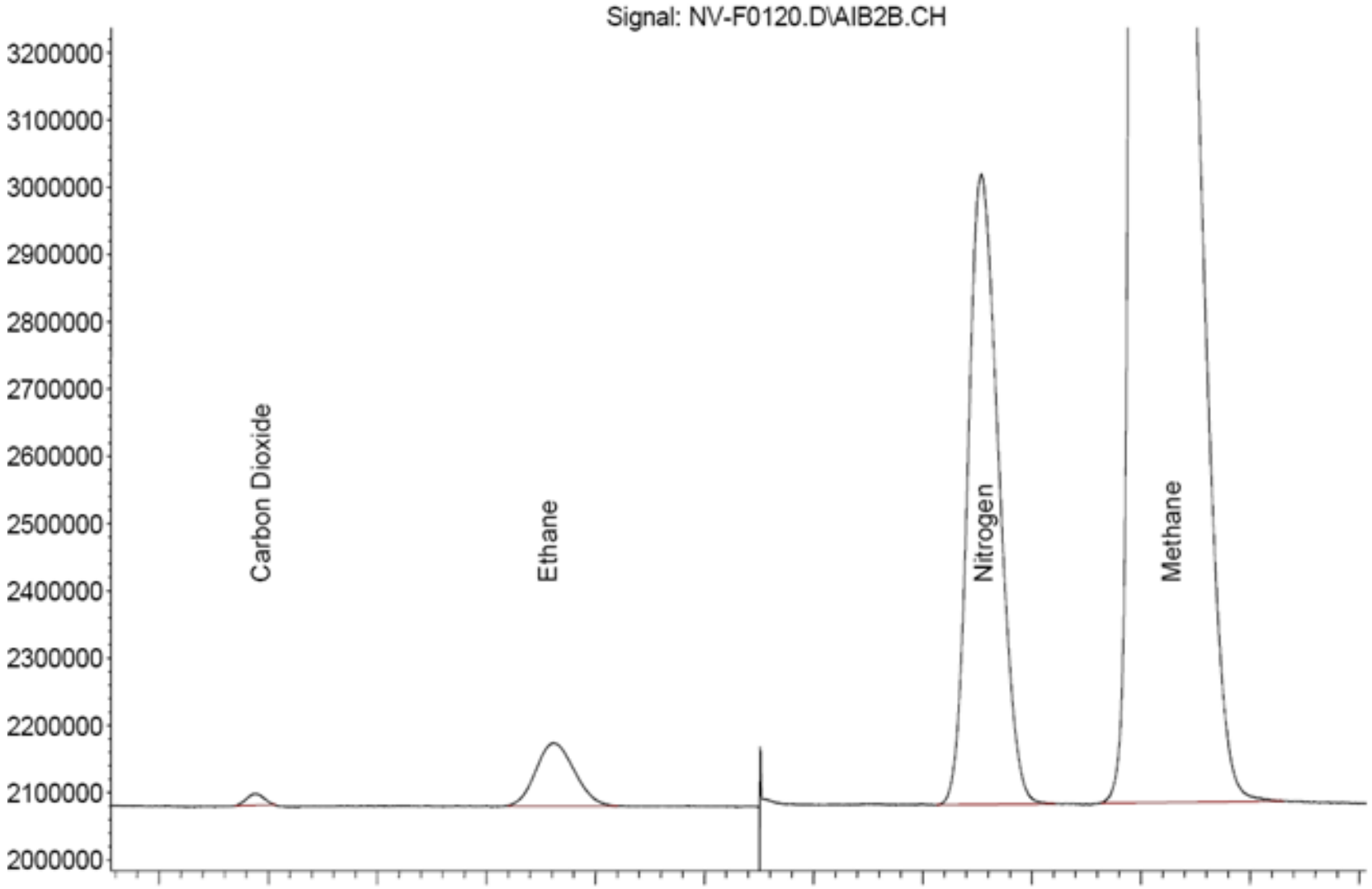
Example JAS NGA

- Hydrocarbons (C1 – C6+) with FID
  - 10 consecutive runs, overlayed



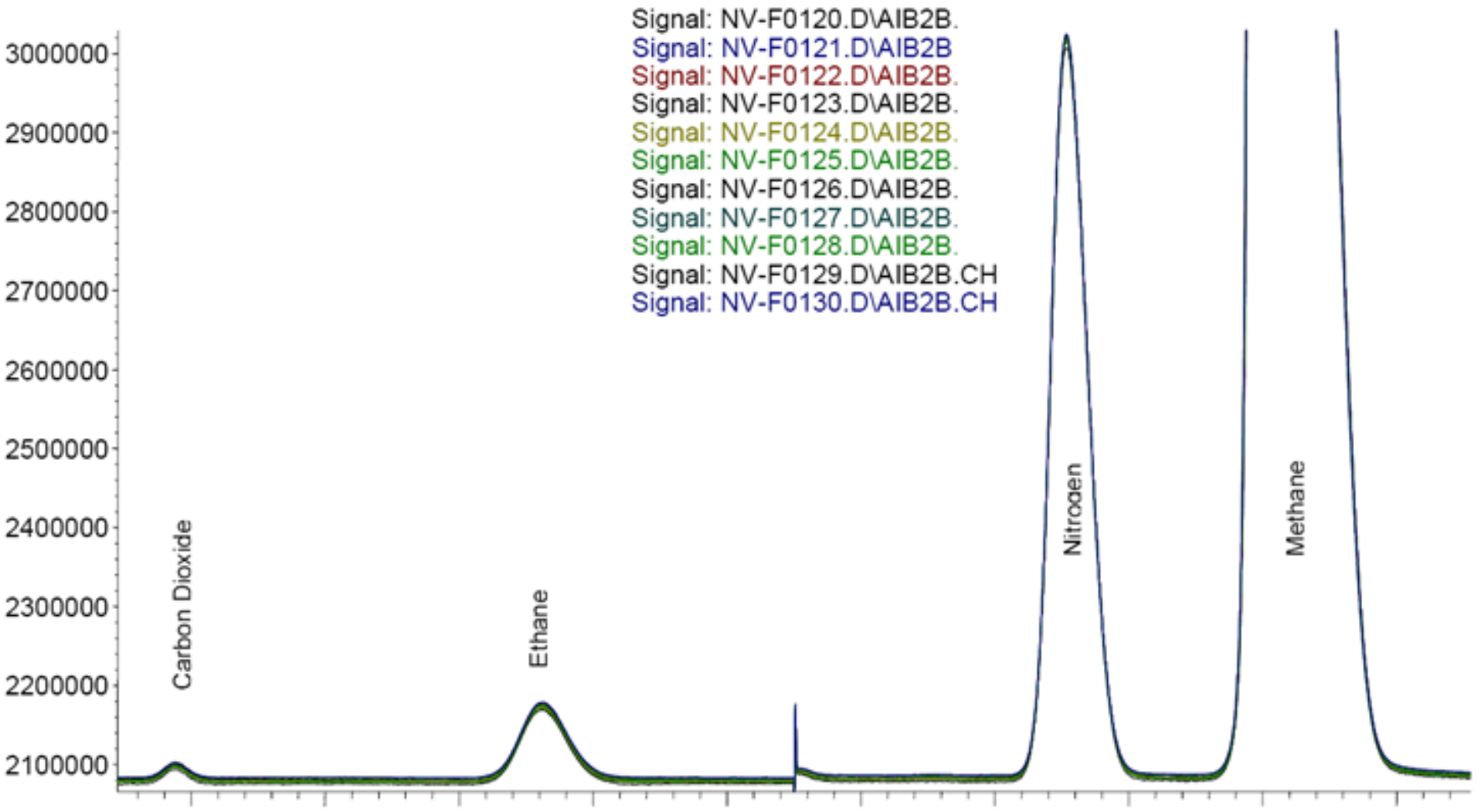
Example JAS NGA

- TCD Signal



Example JAS NGA

- TCD Signal - 10 consecutive runs, overlayed, zoomed



Example JAS NGA

- FID & TCD Signal and Standard Deviation

FID Signal														
Compounds		Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Area 9	Area 10	Average	Standard Deviation	Standard Deviation in %
Methane	CH4	1954680,2	1954972,7	1955799,1	1954309,6	1954081	1954320,7	1956424,5	1956549,8	1957204,5	1957658,9	1955600,1	1303,145316	0,066636595
Ethane	C2H6	46806,8	46808,7	46819,3	46797,5	46792,6	46795,8	46836,9	46832,1	46856,5	46863,9	46821,01	25,44350822	0,054342075
Propane	C3H8	3255,1	3255,9	3253,5	3251,4	3250,7	3251,6	3254,5	3252,3	3253,4	3255,9	3253,43	1,895638269	0,058265838
iso-Butane	C4H10	910,1	911,4	911,3	911,5	911,2	911,1	912,6	911,4	912,1	912,1	911,48	0,682804674	0,074911646
n-Butane	C4H10	781,3	781,3	782,6	781,7	781,2	780,9	782	782,1	782	782,5	781,76	0,573875712	0,07340817
Neo Pentane	C5H12	424	424	423,6	424,1	424,4	424,8	424,3	423,8	424	424,4	424,14	0,343834586	0,081066295
iso-Pentane	C5H12	374	376,5	376,3	376,4	376,5	376,5	375,6	375,9	374,5	374,5	375,67	0,976444798	0,259920888
n-Pentane	C5H12	254,2	253,2	253,6	253,4	254,1	254,9	255,7	256,5	253,4	254,3	254,33	1,081203034	0,425118167
Total C6+		4222,7	4248,3	4236,8	4221	4242,1	4243,8	4211,9	4253,3	4262,3	4273,9	4241,61	19,27966401	0,454536462
Total 1 (FID Signal)		2011708,4	2012032	2012856,1	2011326,6	2011113,8	2011360,1	2013478	2013637,2	2014322,7	2014800,4	2012663,53	1340,257623	0,066591241
TCD Signal														
Carbon Dioxide	CO2	62,1	62,4	62,1	62,7	61,2	62,4	62,7	61,6	62,6	61,8	62,16	0,501553143	0,806874426
Ethane	C2H6	619,4	622,1	623,7	619,1	621,3	622,3	624,2	621,2	622,6	621,6	621,75	1,633843458	0,262781417
Nitrogen	N2	4705,6	4717,9	4713,2	4716,4	4713,8	4716,1	4728,6	4719,8	4724,3	4712,1	4716,78	6,46216338	0,137003705
Methane	CH4	30610,3	30598,5	30604	30581,8	30599,2	30603,1	30612,8	30607,2	30599,2	30597,3	30601,34	8,637669434	0,028226442
Total 2 (TCD Signal)		35997,4	36000,9	36003	35980	35995,5	36003,9	36028,3	36009,8	36008,7	35992,8	36002,03	12,62836755	0,035076821

Example JAS NGA

- FID & WLD Signal and Standard Deviationc
- Zoomed

FID Signal			
		Standard	Standard
Compounds		Deviation	Deviation in %
Methane	CH4	1303,145316	0,066636595
Ethane	C2H6	25,44350822	0,054342075
Propane	C3H8	1,895638269	0,058265838
iso-Butane	C4H10	0,682804674	0,074911646
n-Butane	C4H10	0,573875712	0,07340817
Neo Pentane	C5H12	0,343834536	0,081066295
iso-Pentane	C5H12	0,976444798	0,259920888
n-Pentane	C5H12	1,081203034	0,425118167
Total C6+		19,27966401	0,454536462
Total 1 (FID Signal)		1340,257623	0,066591241

TCD Signal			
Carbon Dioxide	CO2	0,501553143	0,806874426
Ethane	C2H6	1,633843458	0,262731417
Nitrogen	N2	6,462163388	0,137093705
Methane	CH4	8,637669434	0,028226442
Total 2 (TCD Signal)		12,62836755	0,035076821

BTU SW Tool

- Calorific Value – Pureness determines Price

Calculation according to DIN 51857 / ISO 6976

25 GRD / 273,15 K;101.325 kPa

Compound	Symbol	Mol-%	Uns. %			
Helium	He					
Carbon Dioxide	CO2			**Calorific Value**	35,983	(MJ/m3)
Nitrogen	N2			**Calorific Value**	9,995	(kWh/m3)
Oxygen	O2					
Hydrogen	H2			**Calorific Value**	32,430	(MJ/m3)
Carbon Monoxide	CO			**Calorific Value**	9,008	(Kwh/m3)
Methane	CH4	90,0000				
Ethane	C2H6			**Molar Mass**	14,5076	(kg/kmol)
Ethene	C2H4					
Propane	C3H8			**Standard Density**	0,64853	(kg/m³)
Propene	C3H6			**Relative Density**	0,5016	
iso-Butane	i-C4H10					
n-Butane	n-C4H10			**Wobbe index (top)**	50,806	(MJ/m3)
iso-Pentane	i-C5H12			**Wobbe index (top)**	14,113	(kWh/m3)
n-Pentan	nC5H12					
neo-Pentane	neo-C5			**Wobbe index (bottom)**	45,79	(MJ/m3)
Total C6+	C6+	0,0800			12,719	(kWh/m3)
Total		90,0800		**Real gas factor:**	0,99803	

JAS BTU SW Tool

Integrated into:

- ChemStation
- EzChrom