INNOVATIVE SYSTEM FOR THE ANALYSIS OF GAS QUALITY AND PCS/HHV

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Enabling the energy transition

Regas is a leading technology partner for the transition to a **cleaner and safer energy system.**

We provide innovative technologies for natural gas regulation, metering and analysis & for injection and analysis of **green gases like biomethane and hydrogen.**

25 yeas of experience to drive meaningful innovation in the digitalization field and towards a **more sustainable energy industry.**

IGU International Gas Union / Union Internationale du Gaz

EBA European Biogas Association

CIB Consorzio Italiano Biogas

European Clean Hydrogen Alliance

H2IT Associazione Italiana Idrogeno e Celle a Combustibile

CIG Comitato Italiano Gas

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Expertise & Innovation

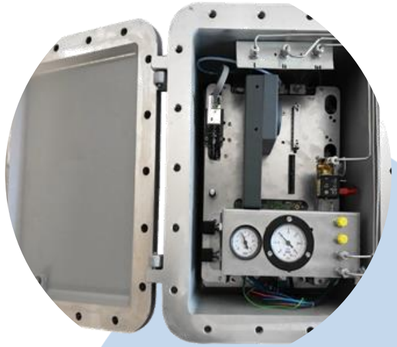
Market leader for Odorization Automatic Systems

Digital Platform & AI for Multi-Gas Grid 4.0

Advanced control system for preheating

Plug&play unit of Power-to-gas for decarbonizing grids & hard-to-abate **industrial processes**

Gas inspection Systems



Gascromatographic devices for in-line gas analysis

DRS, MRS & Gas treatement plants

Technologies and stations for biomethane injection

Chromex | Gas composition and more

- Chromex is a **multi-functional modular system** based on **miniaturized gas chromatography modules**:

- Chromex can include **up to 4 analytical modules** for analysis of compounds like alkanes, alkenes, methane, ethane, propane, iso-butane, n-butane, iso-pentane, n-pentane, hexanes and above, nitrogen, carbon dioxide for the determination of PCS , analysis of hydrogen, H2S and oxygen concentrations

- **ATEX**/IECEX – zone 1 Certified

- Certified according to international regulations **OIML R140 / WELLMEC / ISO6976** for PCS/HHV measurement for natural gas and biomethane

- Same technological base of GRETA (more than 450 installations (proven technology)

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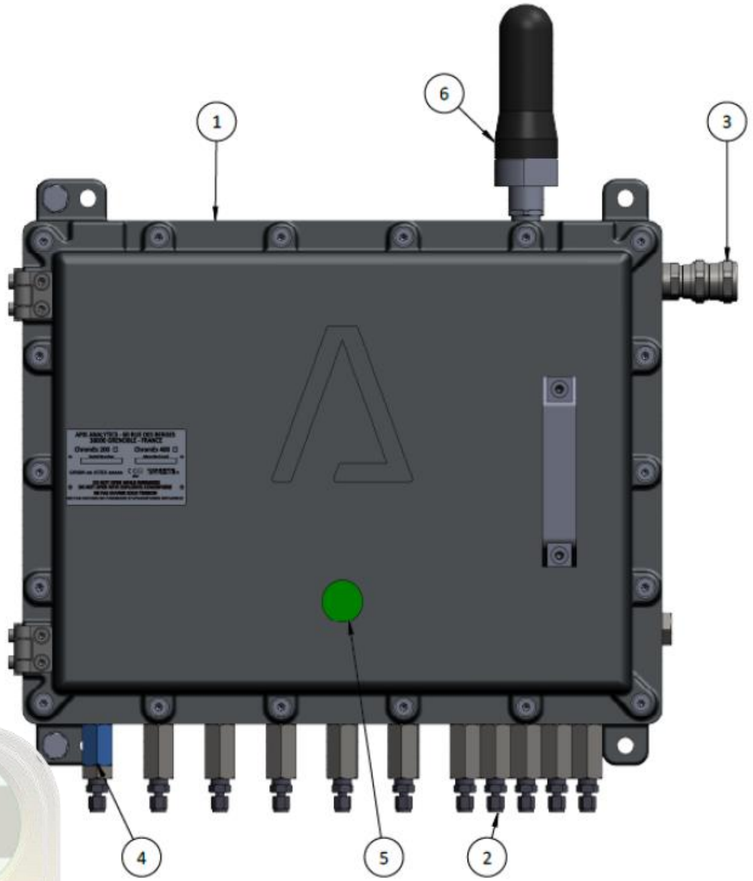
Chromex | Advantages

- Compliant to Italian and European regulations
- **Hydrogen ready GC** (up to 25% H2)
- GC technology that ensures the highest performance and **reduced analysis times** (one measurement every 5 minutes) -> frequent and precise measurements
- **Extremely compact** for installations in city gates
- **Modular architecture** and possibility of multi-component analysis (Calorific Value + H2S + O2 + CO2 with a single device)
- Maximum reliability and minimum maintenance costs
- Extremely optimized energy and carrier gas consumption = **OPEX reduced to a minimum**

① Atex Enclosure
② Gas Tubing Fittings
③ Electrical Cable Glands
④ Breather
⑤ Power On LED Indicator
⑥ Wifi Antenna (Option)



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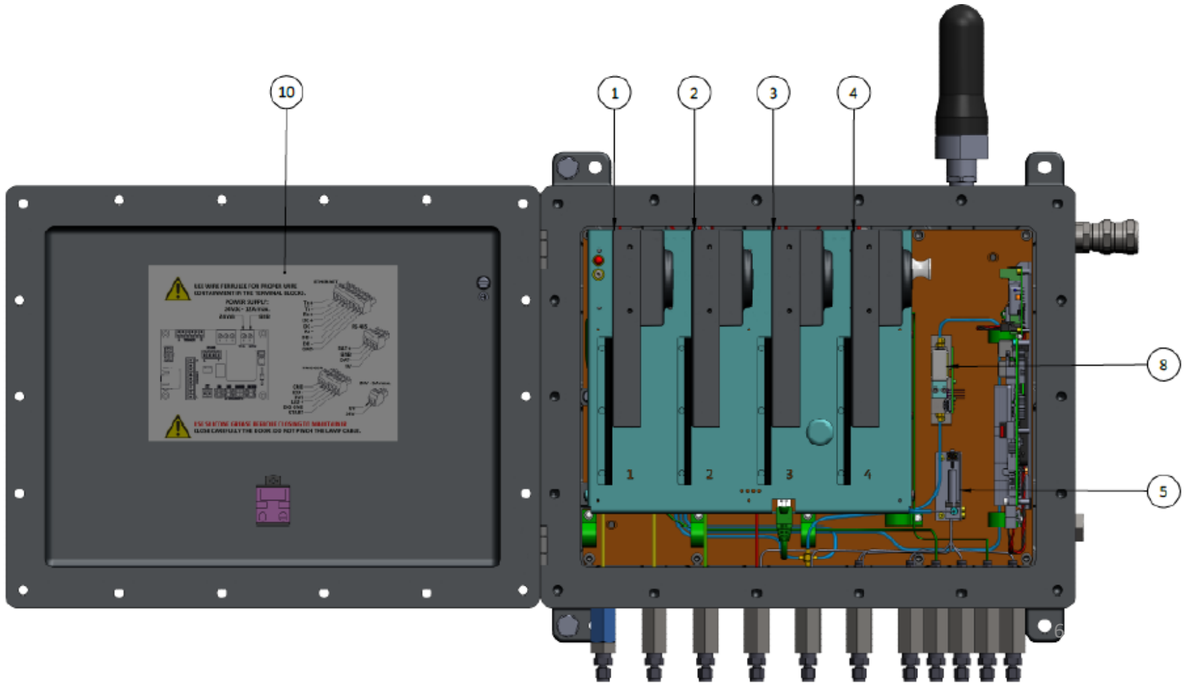
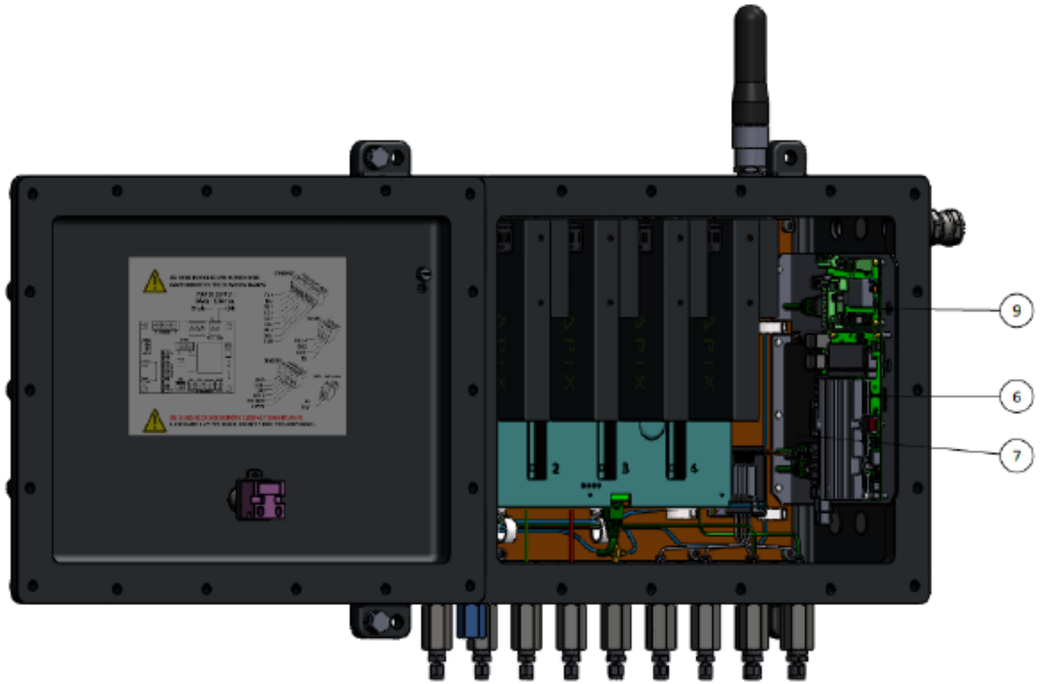
Chromex| miniaturized modules





① Analytical Module #1
② Analytical Module #2
③ Analytical Module #3
④ Analytical Module #4
⑤ Steam Selector
⑥ Computer
⑦ HDD
⑧ Electronic Pressure Controller
⑨ Switchboard
⑩ Wiring Label

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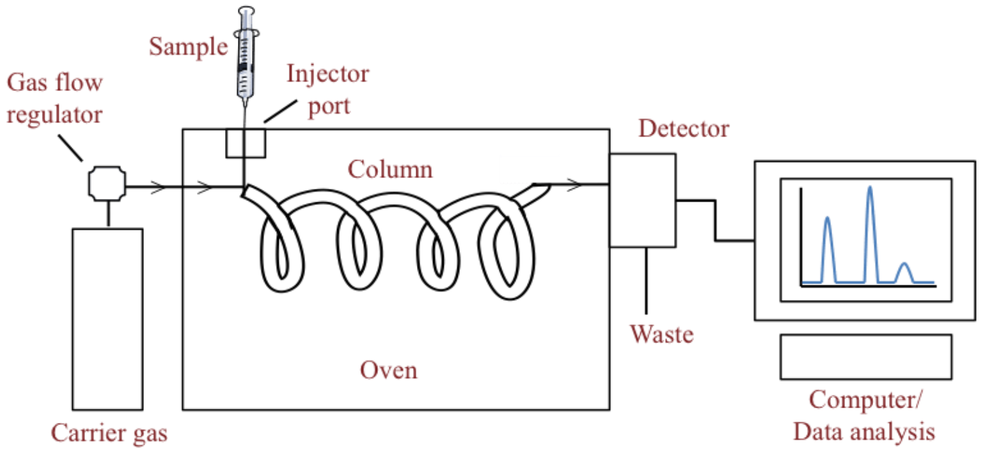
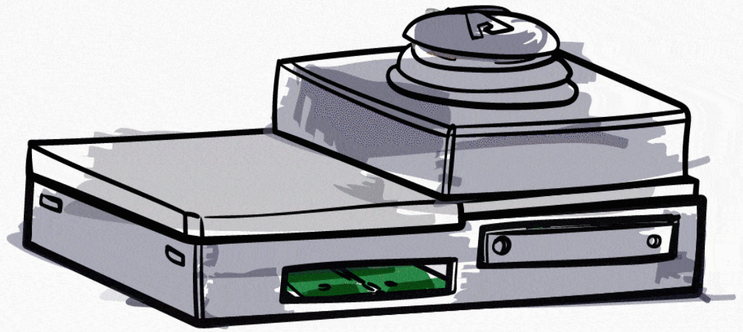
Advanced Technology



1. COLUMN
2. INJECTOR
3. DETECTOR

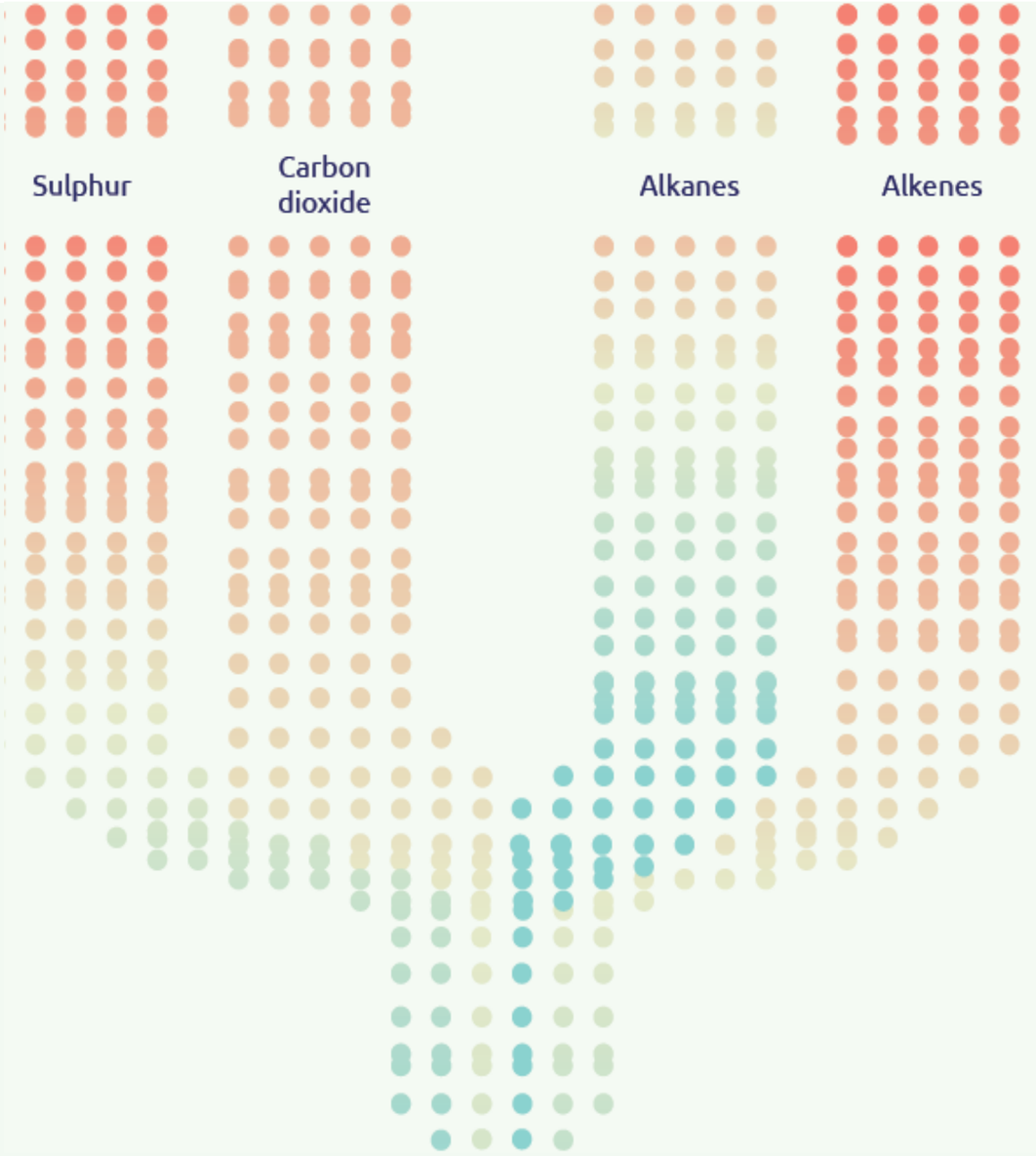


Chromex| possible application

- Distribution and transport networks
- Renewable gases (Biomethane, Syngas and Hydrogen)
- Oil&Gas Industry

Possible applications:

- Calorific Value & Wobbe Index of natural gas
- Calorific Value & Wobbe Index of natural gas + H2 concentration (i.e. for hydrogen-ready networks)
- Biomethane application: Calorific Value & Wobbe Index of biomethane + H2S + O2 + CO2 with one device



Technical features

Sizes and Weight	
Sizes	A 596, L 526, P 290 (mm)
Weight	39.2 kg (con kit opzionale Wi-FI)
Power supply	
DC Input voltage	24.0 V
Typical power consumption	7.71 A @ 24Vdc (ambient temperature 23°C, without options)
Input current	16.9 A max
Recommended circuit breaker	20 A (Characteristic T)
Maximum dissipated power in Running mode	198 Watts
Temperature	
	-10°C / +55°C

CE : CE marking

0080: Reference number of the notified body which issued the Quality Assurance Notification, in this case INERIS

INERIS 20 ATEX 0019 X: EU type-examination certificate number issued by INERIS

IECEx INE 20.0019 X: IECEx certificate number issued by INERIS

II 2 G Ex db IIB or IIB+H2 T5 Gb: gas marking

- **II = Equipment group (I = Mining, II = Surface industries)**
- **2** = Equipment category (2 = frequent risk zone 1 and 21)
- **G** = Gases, vapors
- **Ex** = The equipment meets the CENELEC protection standards for electrical equipment
- **d** = Type of protection: explosion proof
- **b** = The index b corresponds to the protection level (EPL) Gb
- **IIB =** Gas group
- **IIB+H2** = Gas group including hydrogen
- **T5** = Temperature class corresponding to an environment whose self-ignition temperature is higher than 100 °C.
- **Gb** = Equipment protection level

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OIML R140 Certification

ChromEx 400 system (without Wi-Fi) is certified for PCS/HHV measurement according to relevant standards:

- OIML R140 (Classe A)
- WELLMEC
- ISO6976

OIML R140 Classe A	
PC Repeatability	< 0,1 %
PC Maximum error	< 0,5 %
Peak repeatability	10% @ 2 ppm
Calibration frequency	One a year
System stabilization time	< 2h
Analysis time	2 minutes for PCS/HHV

Compounds and concentration ranges		
	Min (%)	Max (%)
Nitrogen	0,1	22
Carbon dioxide	0,1	15
Methane	49,9	100
Ethane	0,1	20
Propane	0,1	10
n-Butane	0,1	2
2-Methylpropane (iC4)	0,1	2
n-Pentane	0,15	0,35
2-Methylbutane (iC5)	0,1	0,35
2,2 Dimethylpropane (neoC5)	0,1	0,35
C6+	0,09	0,35
Oxygen (O2)	0	3

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Natural gas application

System configuration	Compounds
ChromEx 400 w/o Wi-Fi *[RAK303952]*	**High Calorific Value, Low Calorific Value, Wobbe Index, Relative Density, Compressibility Factor**
MK10-TCD-2µL-PPU10-PPU1-F2 *[MOD302674]*	**N2+O2, CH4, CO2, C2H6**
MK10-BFTCD-2µL-PDMS15-PDMS2-F2 [MOD304296]	**C3H8, i- and n-C4H10, i- n- and neo-C5H12, C6+**

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Natural gas application + H2

System configuration	Compounds
ChromEx 400 w/o Wi-Fi *[RAK303952]*	**High Calorific Value, Low Calorific Value, Wobbe Index, Relative Density, Compressibility Factor**
MK10-TCD-2µL-PPU10-PPU1-F2 *[MOD302674]*	**N2+O2, CH4, CO2, C2H6**
MK10-BFTCD-2µL-PDMS15-PDMS2-F2 [MOD304296]	**C3H8, i- and n-C4H10, i- n- and neo-C5H12, C6+**
MK10-TCD-2µL-MS5A15-PPU5-R2 *[MOD303795]*	**H2, O_2, N_2**

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Biomethane application

System configuration	Compounds
ChromEx 400 w/o Wi-Fi *[RAK303952]*	**High Calorific Value, Low Calorific Value, Wobbe Index, Relative Density, Compressibility Factor**
MK10-TCD-2µL-PPU10-PPU1-F2 *[MOD302674]*	**N_2+O_2, CH_4, CO_2**
MK10-TCD-20µL-PPU10-PPU1-F2 *[MOD302678]*	**H_2S, COS**
MK10-TCD-20µL-MS5A15-PPU5-R2 *[MOD303995]*	**O_2, N_2**

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Thank you for your time

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