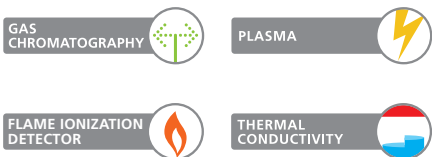




GAS	MEASURES	APPLICATION
MULTIPLE	PERCENT	QUALITY
	TRACE	PROCESS CONTROL
	ULTRA TRACE	

SENSING TECHNOLOGY



KEY APPLICATIONS

- Medical gas production
- Air separation plants
- Cryogenic truck loading station
- High purity gas production

HIGHLY VERSATILE TRACE GAS ANALYZER PLATFORM CONFIGURABLE TO A WIDE RANGE OF APPLICATIONS

UNRIVALLED PERFORMANCE

- Uses ultra-sensitive and highly selective patented PED sensing technology, delivering the highest reliability and performance currently available
- PlasmaHC measures methane and NMHC without the use of a FID, eliminating the need for maintenance and fuel. ArgonSep separates Ar from O₂ without the need for scrubbers, providing a sensitive, maintenance-free measurement

FLEXIBLE

- Comprehensive solution for ultra-trace H₂, Ne, O₂, N₂, Ar, CH₄, CO, CO₂ and NMHC in a number of background gases; H₂, O₂, N₂, Ar, He and CO₂
- Plasma, FID and TCD technologies used depending on application
- Compact design that fits into a single 4U rack
- Flexible communication options including Ethernet, RS232 and 4-20 mA output

EASY TO USE

- Comprehensive device interaction and monitoring via intelligent software
- Remote configuration via Ethernet/Internet
- Electronic carrier and sample flow PID control system
- Remote range I.D. contact per impurity

LOW COST OF OWNERSHIP

- Simplified reporting functions facilitated by the software
- PED sensing technology does not require a separate methanizer

BENCHMARK COMPLIANCE

- Class B digital apparatus requirements of ICES-001 of Canada through the application of EN 61000-6-3:2007
- Part 15 of the US FCC rules for Class B equipment
- IEC 61010-1 for electrical safety
- EC "Low Voltage Directive" by application of EN 61010-1 and rated for Over Voltage Category II, Pollution Degree 2

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HIGH VERSATILITY FOR DIVERSE APPLICATION NEEDS

Applications that depend on the very highest levels of product purity depend on trace analysis of exceptional sensitivity and performance. Impurities requiring measurement are both diverse in nature and found in a number of background gas streams, so high flexibility is also a must. Measurements need to be reliable, so a technology that can provide stability is essential. No matter what your application monitoring requirements, you'll also want a solution that is easy to use and has a low lifetime cost-of-ownership. We don't believe you should have to compromise.

A NO COMPROMISE SOLUTION

The Chroma's flexible ultra-trace analysis is delivered through a smart combination of cutting-edge sensing technology and intelligent control software. Benefiting from the fast, accurate, sensitive and selective response of Servomex's non-depleting Plasma Emission Detector (PED) cell, Flame Ionization Detector (FID) or Thermal Conductivity (TCD) technologies, the Chroma offers sophisticated configuration and performance options which are far ahead of the competition.

EASY AND INTUITIVE TO USEW

Added to the Chroma's measurement performance is its ability to provide an easy-to-use solution with added flexibility. Feature-rich software permits full device interaction remotely via Ethernet/Internet, while a full range of reporting options provide simplified statistical data analysis. The Chroma also features a user-friendly high resolution TFT color LCD for easy local configuration and interaction.

USEFUL LINKS



These analyzers are not intended for any form of use on humans and are not medical devices as described in the Medical Devices Directive 93/42EEC.

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TECHNICAL DATA SHEET

SERVOPRO Chroma



SPECIFICATIONS

TECHNOLOGY	Plasma Emission Detector (PED), Flame Ionization Detector (FID), Thermal Conductivity Detector (TCD)
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PERFORMANCE

PLASMA EMISSION DETECTOR (PED)

Limit of Detection (LOD)		Background Gas					
		H ₂	O ₂	N ₂	Ar	He	CO ₂
Impurities	H ₂	-	25ppb or 1% FR*			7.5ppb or 0.75% FR*	100ppb or 1% FR*
	Ne	-	-	-	-	5ppb or 0.5% FR*	-
	O ₂	-	-	25ppb or 1% FR*		7.5ppb or 0.75% FR*	100ppb or 1% FR*
	N ₂	5ppb or 0.5% FR*		-	5ppb or 0.5% FR*		
	Ar	5ppb or 0.5% FR*			-	5ppb or 0.5% FR*	
	CH ₄	25ppb or 1% FR*				7.5ppb or 0.75% FR*	100ppb or 1% FR*
	CO	25ppb or 1% FR*				7.5ppb or 0.75% FR*	100ppb or 1% FR*
	CO ₂	25ppb or 1% FR*				7.5ppb or 0.75% FR*	-
NMHC	25ppb or 1% FR*				7.5ppb or 0.75% FR*	-	

Min range = 0-1ppm, for all backgrounds except for CO₂ where min range = 0-10ppm. Max range is application dependent

FLAME IONIZATION DETECTOR (FID)

Limit of Detection (LOD)		Background Gas		
		O ₂	N ₂ O	CO ₂
Impurities	CH ₄	1ppm or 1% FR*	-	-
	C ₂ - C ₄	100-150ppb [†] or 1%-1.5% [†] FR*	-	-
	NMHC	100-150ppb [†] or 1%-1.5% [†] FR*	-	-
	CO	-	Complies with European Pharmacopeia	

Min range = 0-1ppm. Max range = 600ppm (impurity and application dependent)

THERMAL CONDUCTIVITY DETECTOR (TCD)

Limit of Detection (LOD)		Background Gas	
		N ₂	N ₂ O
Impurities	N ₂ (assay)	Complies with US or European Pharmacopeia	-
	CO ₂	-	Complies with European Pharmacopeia

Ranges from ppm to 100% (impurity and application dependent)

SIGNAL OUTPUTS/INPUTS

Analog output	1 x 4-20 mA output per peak - up to 8 outputs
Digital outputs	1 x Remote range identification output per peak - up to 8 2 x Alarm dry contact outputs - user pre-settable limited 1 x System status dry contact output
Digital inputs	1 x digital isolated input - remote initiation of analysis
Serial comms	Remote interaction via RS232 ASCII protocol and ethernet/internet

OPERATING ENVIRONMENT

Temperature	+5°C - +40°C/41°F - 104°F
Relative humidity	0-95% RH non-condensing
Altitude	2000m (max)
Ingress Protection	IP20

* Whichever is the greater. FR = Full Range
† Dependent on impurity

The performance specification has been written and verified in accordance with the international standard IEC 61207-1:1994 "Expression of performance of gas analyzers"



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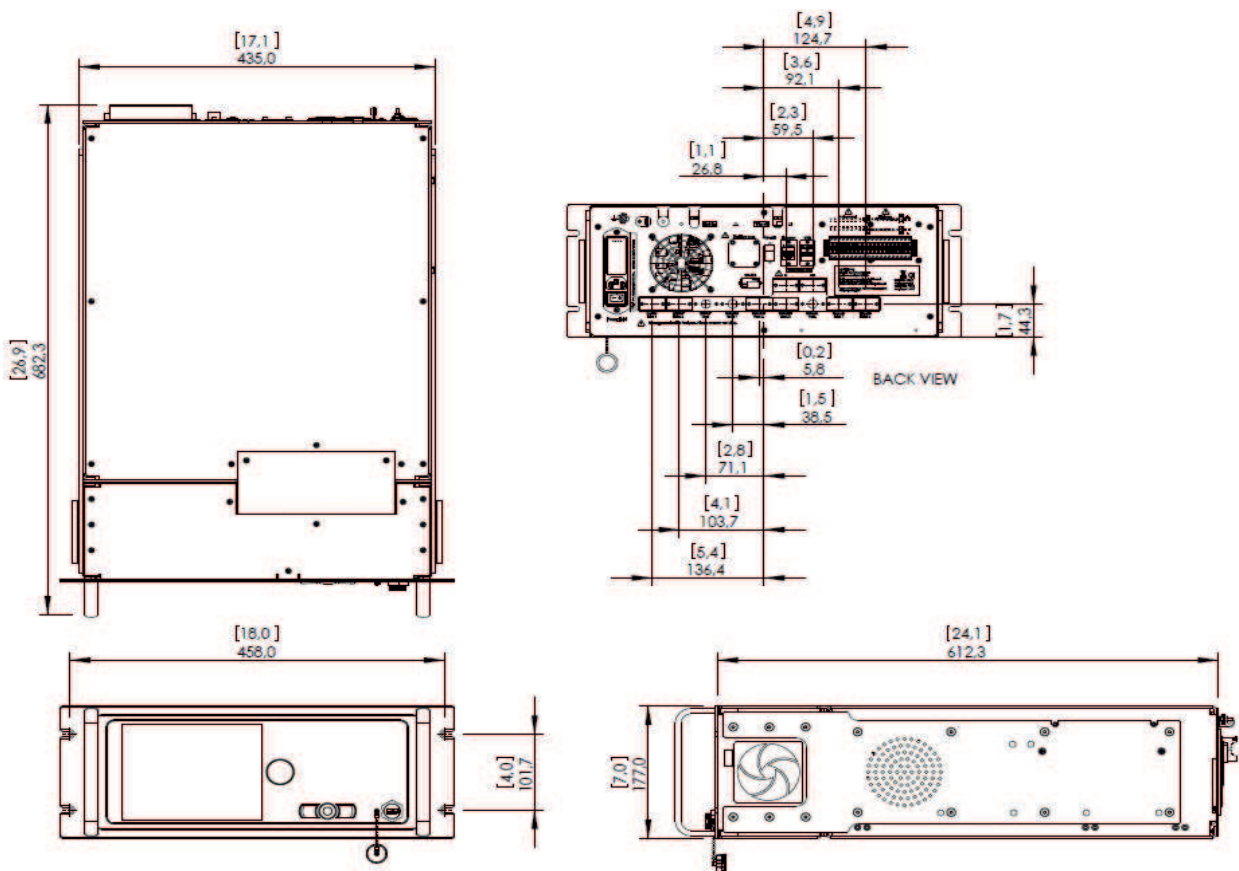
SAMPLE GAS	
Condition	Sample must be oil free, non-corrosive, non-condensing and non-flammable mixtures
Sample flow	Typically 25-150ml/min (application dependent)
Sample pressure	10-20psig (application dependent)
CARRIER GAS	
Carrier gas	Argon or helium (or both)
Carrier gas flow	Typically 30-350ml/min
Carrier gas pressure	100psig (PED, TCD), 120psig (FID)
PHYSICAL	
Size	482mm (18.9") Wide x 177mm (7") High x 600mm (23.6") Deep
Weight	11-27kg (25-60lb) (application dependent)
UTILITIES	
Supply voltage	100-120Vac or 220-240Vac**, 50/60Hz

** The analyzer is supplied configured with one of these voltage ranges; specify range at time of order

COMPLIANCE

EC DIRECTIVES	This product complies with the EMC Directive, the Low Voltage Directive, and all other applicable directives.
ELECTRICAL SAFETY	Electrical safety to IEC 61010-1: Ed 3. Rated for "Overvoltage Category II" and "Pollution Degree 2"

DIMENSIONAL DRAWINGS



Dimensions shown in millimetres
(dimensions in square brackets are in inches)



APPLICATION CONFIGURATIONS

	Background gas	Application	Min Range	Max Range	Product variant	Packages	Detector	Form factor	
AIR SEPARATION	CRUDE ARGON	N ₂ in 10% Ar and 90% O ₂	0-50ppm	0-5000ppm	4401A1	Pack 1A	Plasma	MC	
	OXYGEN	CH ₄ , NMHC	0-10ppm/0-5ppm	0-600ppm/0-200ppm	4405A1	Pack 2A	Plasma	MC	
	HCs in LOX/AIR	CH ₄ , C ₂ H ₂ , C ₂ H ₄ , C ₂ H ₆ , C ₃ H ₆ , C ₃ H ₈	0-10ppm CH ₄ 0-2ppm others	0-600ppm CH ₄ 0-200ppm C ₂ H ₂ 0-300ppm other C ₂ 0-200ppm C ₃ 0-100ppm C ₄	4409A1	Pack 1A	FID	PC + SC	
		CH ₄ , C ₂ H ₂ , C ₂ H ₄ , C ₂ H ₆ , C ₃ H ₆ , C ₃ H ₈ , C ₃ H ₈ , C ₄ H ₆ , C ₄ H ₁₀			4409A1	Pack 2A	FID	PC + SC	
C ₁ -C ₃ , NMHC		4409A1			Pack 2B	FID	PC + SC		
INDUSTRIAL GAS QUALITY - Grade 5 or less	ARGON	O ₂ , H ₂ , N ₂ , CH ₄ , CO	0-10ppm	0-200ppm	4402A1	Pack 1A	Plasma	MC	
		CO ₂	0-10ppm	0-200ppm	4402A1	Pack 1B	Plasma	MC	
		O ₂ , H ₂ , N ₂ , CH ₄ , CO, CO ₂	0-10ppm	0-200ppm	4402A1	Pack 2A	Plasma	MC	
	HELIUM	O ₂ , H ₂ , N ₂ , CH ₄ , CO	0-10ppm	0-200ppm	4403A1	Pack 1A	Plasma	MC	
		Ar	0-10ppm	0-200ppm	4403A1	Pack 1B	Plasma	MC	
		CO	0-10ppm	0-200ppm	4403A1	Pack 1C	Plasma	MC	
		N ₂ , Ar	0-10ppm	0-200ppm	4403A1	Pack 2A	Plasma	MC	
		CO, N ₂ , CH ₄ , CO ₂	0-10ppm	0-200ppm	4403A1	Pack 2B	Plasma	MC	
		O ₂ , H ₂ , N ₂ , CH ₄ , CO, Ar, Ne	0-10ppm	0-200ppm	4403A1	Pack 3A	Plasma	PC + SC	
		O ₂ , H ₂ , N ₂ , CH ₄ , CO ₂ , Ar, Ne	0-10ppm	0-200ppm	4403A1	Pack 3B	Plasma	PC + SC	
		O ₂ , H ₂ , N ₂ , CH ₄ , CO, CO ₂ , Ar, Ne	0-10ppm	0-200ppm	4403A1	Pack 4A	Plasma	MC + SC	
		NITROGEN	O ₂ , H ₂ , CH ₄	0-10ppm	0-200ppm	4404A1	Pack 1A	Plasma	MC
	Ar		0-10ppm	0-200ppm	4404A1	Pack 1B	Plasma	MC	
	CO ₂		0-10ppm	0-200ppm	4404A1	Pack 1C	Plasma	MC	
	CO		0-10ppm	0-200ppm	4404A1	Pack 1D	Plasma	MC	
	O ₂ , H ₂ , CH ₄ , Ar		0-10ppm	0-200ppm	4404A1	Pack 2A	Plasma	MC	
	O ₂ , H ₂ , CH ₄ , CO		0-10ppm	0-200ppm	4404A1	Pack 2B	Plasma	MC	
	O ₂ , H ₂ , CH ₄ , CO ₂		0-10ppm	0-200ppm	4404A1	Pack 2C	Plasma	MC	
	O ₂ , H ₂ , CH ₄ , Ar, CO		0-10ppm	0-200ppm	4404A1	Pack 3A	Plasma	PC + SC	
	O ₂ , H ₂ , CH ₄ , Ar, CO ₂		0-10ppm	0-200ppm	4404A1	Pack 3B	Plasma	PC + SC	
	O ₂ , H ₂ , CH ₄ , CO, CO ₂		0-10ppm	0-200ppm	4404A1	Pack 3C	Plasma	PC + SC	
	O ₂ , H ₂ , CH ₄ , Ar, CO, CO ₂		0-10ppm	0-200ppm	4404A1	Pack 4A	Plasma	MC + SC	
	OXYGEN		N ₂	0-10ppm	0-200ppm	4405A1	Pack 1A	Plasma	MC
			Ar	0-10ppm	0-200ppm	4405A1	Pack 1B	Plasma	MC
		N ₂ , H ₂ , CH ₄	0-10ppm	0-200ppm	4405A1	Pack 2B	Plasma	MC	
		Ar, N ₂	0-10ppm	0-200ppm	4405A1	Pack 2C	Plasma	MC	
		N ₂ , H ₂ , CH ₄ , CO ₂	0-10ppm	0-200ppm	4405A1	Pack 3A	Plasma	PC + SC	
		H ₂ , CO, CH ₄ , CO ₂	0-10ppm	0-200ppm	4405A1	Pack 3B	Plasma	PC + SC	
		N ₂ , H ₂ , CH ₄ , CO ₂ , CO	0-10ppm	0-200ppm	4405A1	Pack 4A	Plasma	MC + SC	
		N ₂ , H ₂ , CH ₄ , CO ₂ , CO, Ar	0-10ppm	0-200ppm	4405A1	Pack 5A	Plasma	MC + SC	
		N ₂ , H ₂ , CH ₄ , CO ₂ , CO, Ar, NMHC	0-10ppm	0-200ppm	4405A1	Pack 6A	Plasma	PC + SC + SC	
		HYDROGEN	N ₂	0-10ppm	0-200ppm	4407A1	Pack 1A	Plasma	MC
	N ₂ , CO ₂ , CH ₄ , CO		0-10ppm	0-200ppm	4407A1	Pack 1B	Plasma	MC	
	N ₂ , CO ₂ , CH ₄		0-10ppm	0-200ppm	4407A1	Pack 2A	Plasma	MC	
	CO, CO ₂ , CH ₄		0-10ppm	0-200ppm	4407A1	Pack 2B	Plasma	MC	
	N ₂ , Ar		0-10ppm	0-200ppm	4407A1	Pack 2C	Plasma	MC	
	N ₂ , CO ₂ , CH ₄ , CO		0-10ppm	0-200ppm	4407A1	Pack 3A	Plasma	PC + SC	
	N ₂ , CO ₂ , CH ₄ , CO, Ar		0-10ppm	0-200ppm	4407A1	Pack 4A	Plasma	MC + SC	
	CARBON DIOXIDE	O ₂ , H ₂ , N ₂ , CH ₄	0-10ppm	0-200ppm	4408A1	Pack 1A	Plasma	MC	
		Ar	0-10ppm	0-200ppm	4408A1	Pack 1B	Plasma	MC	
O ₂ , H ₂ , N ₂ , CH ₄ , CO		0-10ppm	0-200ppm	4408A1	Pack 2A	Plasma	MC		
O ₂ , H ₂ , N ₂ , CH ₄ , CO, Ar		0-10ppm	0-200ppm	4408A1	Pack 3A	Plasma	PC + SC		

NOTES MC = MASTER CHASSIS, SC = SECONDARY CHASSIS, PC = STAND-ALONE COMPUTER

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ANALYZERS
HIGH-PERFORMANCE GAS ANALYSIS

	Background gas	Application	Min Range	Max Range	Product variant	Packages	Detector	Form factor	
INDUSTRIAL GAS QUALITY - Grade 5N or better	ARGON	O ₂ , H ₂ , N ₂ , CH ₄	0-1ppm	0-10ppm	4402A1	Pack 1A	Plasma	MC	
		O ₂ , H ₂ , N ₂ , CH ₄ , CO	0-1ppm	0-10ppm	4402A1	Pack 2A	Plasma	MC	
		O ₂ , H ₂ , N ₂ , CH ₄ , CO, CO ₂	0-1ppm	0-10ppm	4402A1	Pack 3A	Plasma	PC + SC	
	HELIUM	O ₂ , H ₂ , N ₂ , CH ₄	0-1ppm	0-10ppm	4403A1	Pack 1A	Plasma	MC	
		Ar	0-1ppm	0-10ppm	4403A1	Pack 1B	Plasma	MC	
		CO	0-1ppm	0-10ppm	4403A1	Pack 1C	Plasma	MC	
		O ₂ , H ₂ , N ₂ , CH ₄ , CO	0-1ppm	0-10ppm	4403A1	Pack 2A	Plasma	MC	
		O ₂ , H ₂ , N ₂ , CH ₄ , Ar	0-1ppm	0-10ppm	4403A1	Pack 2B	Plasma	MC	
		O ₂ , H ₂ , N ₂ , CH ₄ , Ar, CO	0-1ppm	0-10ppm	4403A1	Pack 3A	Plasma	PC + SC	
		O ₂ , H ₂ , N ₂ , CH ₄ , Ar, CO ₂	0-1ppm	0-10ppm	4403A1	Pack 3B	Plasma	PC + SC	
		O ₂ , H ₂ , N ₂ , CH ₄ , CO, Ar, Ne	0-1ppm	0-10ppm	4403A1	Pack 4A	Plasma	MC + SC	
		O ₂ , H ₂ , N ₂ , CH ₄ , CO ₂ , Ar, Ne	0-1ppm	0-10ppm	4403A1	Pack 4B	Plasma	MC + SC	
		O ₂ , H ₂ , N ₂ , CH ₄ , CO, Ar, Ne, CO ₂	0-1ppm	0-10ppm	4403A1	Pack 5A	Plasma	MC + SC	
		NITROGEN	O ₂ , H ₂ , CH ₄	0-1ppm	0-10ppm	4404A1	Pack 1A	Plasma	MC
	Ar		0-1ppm	0-10ppm	4404A1	Pack 1B	Plasma	MC	
	CO ₂		0-1ppm	0-10ppm	4404A1	Pack 1C	Plasma	MC	
	CO		0-1ppm	0-10ppm	4404A1	Pack 1D	Plasma	MC	
	O ₂ , H ₂ , CH ₄ , Ar		0-1ppm	0-10ppm	4404A1	Pack 2A	Plasma	MC	
	O ₂ , H ₂ , CH ₄ , CO		0-1ppm	0-10ppm	4404A1	Pack 2B	Plasma	MC	
	O ₂ , H ₂ , CH ₄ , CO ₂		0-1ppm	0-10ppm	4404A1	Pack 2C	Plasma	MC	
	O ₂ , H ₂ , CH ₄ , Ar, CO		0-1ppm	0-10ppm	4404A1	Pack 3A	Plasma	PC + SC	
	O ₂ , H ₂ , CH ₄ , Ar, CO ₂		0-1ppm	0-10ppm	4404A1	Pack 3B	Plasma	PC + SC	
	O ₂ , H ₂ , CH ₄ , CO, CO ₂		0-1ppm	0-10ppm	4404A1	Pack 3C	Plasma	PC + SC	
	O ₂ , H ₂ , CH ₄ , Ar, CO, CO ₂		0-1ppm	0-10ppm	4404A1	Pack 4A	Plasma	MC + SC	
	OXYGEN	N ₂	0-1ppm	0-10ppm	4405A1	Pack 1A	Plasma	MC	
		Ar	0-1ppm	0-10ppm	4405A1	Pack 1B	Plasma	MC	
		CH ₄ , NMHC	0-1ppm	0-10ppm	4405A1	Pack 2A	Plasma	MC	
		N ₂ , H ₂ , CH ₄	0-1ppm	0-10ppm	4405A1	Pack 2B	Plasma	MC	
		Ar, N ₂	0-1ppm	0-10ppm	4405A1	Pack 2C	Plasma	MC	
		N ₂ , H ₂ , CH ₄ , CO ₂	0-1ppm	0-10ppm	4405A1	Pack 3A	Plasma	PC + SC	
		H ₂ , CO, CH ₄ , CO ₂	0-1ppm	0-10ppm	4405A1	Pack 3B	Plasma	PC + SC	
		N ₂ , H ₂ , CH ₄ , CO ₂ , CO	0-1ppm	0-10ppm	4405A1	Pack 4A	Plasma	MC + SC	
		N ₂ , H ₂ , CH ₄ , CO ₂ , CO, Ar	0-1ppm	0-10ppm	4405A1	Pack 5A	Plasma	MC + SC	
		N ₂ , H ₂ , CH ₄ , CO ₂ , CO, Ar, NMHC	0-1ppm	0-10ppm	4405A1	Pack 6A	Plasma	PC + SC + SC	
	HYDROGEN	N ₂	0-1ppm	0-10ppm	4407A1	Pack 1A	Plasma	MC	
		N ₂ , CO ₂ , CH ₄	0-1ppm	0-10ppm	4407A1	Pack 2A	Plasma	MC	
		CO, CO ₂ , CH ₄	0-1ppm	0-10ppm	4407A1	Pack 2B	Plasma	MC	
		N ₂ , Ar	0-1ppm	0-10ppm	4407A1	Pack 2C	Plasma	MC	
		N ₂ , CO ₂ , CH ₄ , CO	0-1ppm	0-10ppm	4407A1	Pack 3A	Plasma	PC + SC	
		N ₂ , CO ₂ , CH ₄ , CO, Ar	0-1ppm	0-10ppm	4407A1	Pack 4A	Plasma	MC + SC	
	CARBON DIOXIDE	N ₂	0-1ppm	0-10ppm	4408A1	Pack 1A	Plasma	MC	
		Ar	0-1ppm	0-10ppm	4408A1	Pack 2A	Plasma	MC	
	MEDICAL GASES	NITROUS OXIDE	CO ₂	0-300ppm	0-300ppm	4415A1	-	TCD	MC
			CO	0-5ppm	0-5ppm	4409A1	-	FID	PC + SC
		CARBON DIOXIDE	CO	0-5ppm	0-5ppm	4409A1	-	FID	PC + SC
		NITROGEN	0-100% N ₂ matrix	0-100%	0-100%	4415A1	Pack 1	TCD	MC
	0-100% N ₂ matrix + 0-30% O ₂		0-100%/0-30%	0-100%/0-30%	4415A1	Pack 2	TCD	MC	

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SERVOMEX ANALYZERS
HIGH-PERFORMANCE GAS ANALYSIS

> WE'RE READY TO HELP

WHATEVER YOUR GAS ANALYSIS REQUIREMENTS, WHEREVER YOU ARE

PBTDSChroma Rev. 0 Date: 04/20

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