HERACLES NEO E-Nose
Data sheet



HERACLES NEO is an electronic nose based on dual flash gas chromatography technology dedicated to smell and aroma analysis.
It allows manual injection and can also be used with an autosampler. The system is composed of:

– A dual fast GC electronic nose unit (hardware) to detect and analyze the volatile compounds in the sample

– A computer for system monitoring, data acquisition and processing with AlphaSoft software

– In some configurations: an autosampler for automated sample handling and injection

HERACLES NEO **Portfolio**

		HERACLES **Dual column - Fast GC E-Nose with chromatography functionalities** Computer - Start-up kit - Leak detector					
	CONFIGURATIONS	CHECK	OPTIMIZE		QUALIFY		ASSESS
		NEO 50	**NEO 100**	**NEO 150**	**NEO 200**	**NEO 250**	**NEO 300**
Hardware	Injection mode	Manual	Headspace compact		Headspace autosampler		Headspace / Liquid
	Sample capacity	/	1 tray x 45 positions		2 trays x 45 positions		1 tray x 60 positions (HS) 3 trays x 54 positions (Liquid)
	FID station (H_2/Air/Compressor)			•	•	•	•
Software	Basic statistics processing	Option	•	•	•	•	•
	Advanced statistics processing		Option	Option	Option	Option	•
	AroChemBase	•	Option	Option	Option	•	•
	Sensory ID	/	/	/	•	•	•
	MMI Pro	/	/	/	Option	Option	Option

* Level A: sample mapping (PCA)
** Level B: sample mapping (PCA) & further investigations (SIMCA, SQC, DFA & PLS)

HERACLES NEO dual flash GC electronic nose

Dimensions

The Heracles instrument is a 23 cm wide, 32 cm high and 44 cm deep and weight of 16 kg. Provide at least 20 cm between the unit and the wall for proper cooling and access to cables and fluid inlets. For complete installation, the space required is 230 cm (width) x 80 cm (depth) x 100 cm (height).

Electrical data

- Connection type : IEC320
- Supply voltage : 120Vac or 230Vac (50Hz or 60Hz)
- Power consumption (standby) : 350W
- Max power consumption : 1100W
- Fuse : 6.3AT (230V) or 10AT (120V)

Operating Environment

- Work environment: indoor use only
- Recommended temperature range for optimal performances: 15°C to 25°C (59°F to 77°F)
- Operating temperature range: 5°C to 40°C (41°F to 104°F)
- Relative humidity range: 0 to 80 % (non condensing)
- Storage temperature and relative humidity range: -40°C to 65°C (-40°F to 149°F) / 5% to 93% RH (non-condensing)
- Pollution degree: 2
- Elevation: <2000 m (6562 ft.)

Inlet

- Splitless type
- Heated up to 300 °C
- Programmable Vent & Septum purge

Trap

- Solid adsorbent trap
- Packing: 10 mg of Tenax TA
- Sub ambient sampling capabilities (Peltier Cooler)
- Temperature controlled from 0 to 280°C

Column and oven

- Metal capillary columns
- Column dimensions: 10 meters length, 0.18mm internal diameter, 0.4µm film thickness
- MXT-5 / MXT-1701 as default assembly
- MXT-5 / MXT-Wax as alternative assembly
- Oven temperature: 35°C to 300 °C
- Heating rate up to 8°C/s (480°C/min)

Detectors

- 2 flame ionization detectors (FID)
- FID ignition monitored by software
- Operating temperature: up to 300°C
- FID Sensitivity: 10^{-10} to 10^{-12} A/mV
- FID dynamic linearity > 10^{6}

Performance

- Start up in less than 20 minutes
- RSD < 0.3% on retention times
- RSD < 3% on peak areas
- Detection limit < 50 pg of n C_{12}
- Usual analysis cycle time: 8 min

Sample requirements

- Air or gaseous samples from 0 to 2 bar (30 psig) at ambient temperature
- Water or soil gas for VOC (Volatile Organic Compounds) / SVOC (Semi-Volatile Organic Compounds) analysis
- Analytes in organic solvents for liquid injections
- Solid or liquid samples for Headspace injections

AlphaSoft Software

Compatible with Windows® 7 and Windows® 10.

This software controls and monitors the instrument and depending on Heracles NEO configurations and includes a full chemometrics package for data processing.

Please refer to the configuration description table.

System monitoring

- Sample sequence monitoring
- Autosampler parameters
- Chromatograph E-nose settings, maintenance & spare parts monitoring
- Columns autocleaning method

Chromatograms data acquisition and storage

- Peaks retention time and peaks area
- Data manipulation: creation of libraries prior to statistical data computing

Gas chromatography functionalities

- Immediate chromatogram visualization, customizable display
- Manual or standard automated integration modes
- Compensation of Drift & Retention Time Alignment
- Batch reprocessing
- Numerous calibration modes
- Alarm set-up on concentration range

Sensory ID

Patented method for global processing of chromatograms with:

– Easy to read chart: PASS/FAIL display results

– No integration peak necessary: simplify chromatographic data exploration, complete fingerprint analysis, all chromatogram points are taken for calculation

– New chromatograms alignment method: calibration (external standard injection) is not necessary

Statistical & chemometrics data processing

- Data pre-processing: chromatograms loading, chromatograms superimposition, reporting
- Multivariate statistics:

  ✓ Libraries loading & retention Times selection

  ✓ Models building and identification of unknown samples

  ✓ Qualitative and quantitative tools

  LEVEL A: sample comparison with PCA (Principal Components Analysis).

  LEVEL B: further investigations with:

– DFA (Discriminant Factorial Analysis): qualitative model and unknown sample identification

– PLS (Partial Least Square): quantification and sensory panel score prediction

– SIMCA (Soft Independent Modeling Classification Analogy): acceptability prediction (good/bad)

– SQC (Statistical Quality Control): qualitative results to check conformity by comparing to a reference

  ✓ Multiple extractions possible for sample trapping or regression sampling

  - Data traceability with logbook and operating condition history

  - Data validation by electronic signature

AroChemBase Software Option



Library of molecules and related sensory attributes for chemical and sensory characterization based on Kovats indices matching.

- Integrated within AlphaSoft to help identify the chemical compounds corresponding to the integrated peaks
- Kovats indices for more than 99,000 compounds on several GC columns including HERACLES columns
- Sensory features for around 2,000 compounds
- Human sensory odor thresholds for more than 1,800 compounds
- Sorting of chemical compounds candidates thanks to a unique recognition accuracy index
- Ability to enrich the database by including user's data and to extract tailored sub-library
- Numerous search options based on one or several criteria (name, application area, keyword, etc)

MMI Pro Software Option



MMI Pro is an intuitive interface that displays only the information you need for your daily work. Find all your tools in one window view to create and launch analysis in an easier and faster way.

- One window view: product selection, sequence launching, signal acquisition, Heracles NEO system & maintenance status.
- Follow the progress of the analysis, result display in sequence table for each product
- Easy reading of results & access to report
- Specifically dedicated to production environment: reduce the number of steps for routine operators and avoid potential errors.

Computer specifications

- CPU: 3rd Gen Intel Core i5-3470 Processor (Quad Core, 3.20GHz Turbo, 6MB, w/ HD2500 Graphics)
- Memory: 8 Go minimum
- Hard disk: 250GB 3.5inch Serial ATA (7,200 Rpm) minimum – Preference with SSD Disk
- Screen resolution: 1024 x 768
- USB port: minimum two USB 2.0 ports (one port to Heracles, one to the security stick (dongle key). USB Hubs are not recommended.
- Ethernet : 2 Ports (one port for PAL-RSI autosampler connection)
- Mouse
- Operating system: Windows 7 (64 Bits)

Autosampler

To better answer our customers needs, Alpha MOS offers different sampling configurations with manual injection or with PAL RSI autosampler delivered with HERACLES NEO portfolio:

- ✓ HERACLES NEO50: manual injection
- ✓ HERACLES NEO100 / 150: headspace injection only (compact autosampler)
- ✓ HERACLES NEO200 / 250: headspace injection only
- ✓ HERACLES NEO300: headspace and liquid injection

Element	HERACLES NEO100 / 150 Compact - Headspace only	HERACLES NEO200 /250 Headspace only	HERACLES NEO300 Headspace and liquid
PAL RSI robot	✓	✓	✓
Headspace vial tray	45 vials (20mL or 10mL in option)	90 vials (20mL or 10mL in option)	60 vials (20mL or 10mL in option) and up to 180 vials in option
Liquid vial tray			3 x 54 vials (2mL)
Agitator oven	6 positions (20mL)	6 positions (20mL)	6 positions (20mL)
Syringes	2 pcs 5mL (gas)	2 pcs 5mL (gas)	2 pcs 5mL (gas) + 2 pcs 10µL (liquid)
Wash station			✓
Dimensions (cm)	70 x 80 x 97 (L x W x H)	100 x 80 x 97 (L x W x H)	100 x 80 x 97 (L x W x H)
Mass (kg)	17.3	20.9	22.7

Certifications

- Europe: CE
- Canada: CAN/CSA std, C22.2 n° 61010-1
- US: ETL listed, UL GST 61010A-1

Power

- Voltage: 100-240 Vac
- Pmax Power: 200 W

Leak detector

With Heracles NEO, an Electronic Leak Detector is delivered (RESTEK, model: cat.# 22655).

- Operating temperature range: 0-48°C
- Humidity range: 0-97%
- Battery rating: 12 hours normal operation
- Power rating: 3.7 volts DC, 60 mA
- Certifications: CE, Ex and Japan
- Compliance: WEEE, RoHS, China RoHS2

Specifications for hydrogen generator

With HERACLES NEO 200 & HERACLES NEO 300, a PARKER (Domnik Hunter) hydrogen generator station (model: 20 H-MD) is delivered.

- Flow Rate: 160 mL/min
- Purity: 99.9999% (5.0) with outlet pressure at 3 bar
- Safety protection: automatic shut-down in case of leakage
- Requires deionized water under ASTM II (> 1MΩ.cm or < 1µS.cm-1)
- Outlet Port: 1/8" Compression
- Voltage: 100-230 Vac (50-60 Hz)
- Pmax: 170 W
- Certifications: EN 61010-1:2001, CSA UL 61010-1, CE Mark

Specifications for zero air source

With HERACLES NEO 200 & HERACLES NEO 300, a PARKER (Domnik Hunter) zero air source station (model: UHP-10 ZAS) is delivered.

- Maximum Zero Air Flow Rate: 1 L/min
- The air purity should respect the following specifications:
  - ✓ O2 + N2 > 99.95%
  - ✓ H2O < 5ppm
  - ✓ CnHm < 5ppm
  - ✓ O2 = 20 ± 1%
- Inlet pressure: 4-10 bar
- Outlet pressure: 2 bar
- Inlet Air temperature: 5-40°C
- Inlet Air dew point: < -40°C
- Inlet connection: ¼"
- Outlet Port: 1/8" Compression
- Voltage: 120 or 230 Vac
- Power: 55 W
- Certifications: EN 61010-1:2001, EN ISO 12100-1/2:2003, CE Mark

Specifications for compressor

With HERACLES NEO 200 & HERACLES NEO 300, a JUN AIR air compressor station is delivered.

- Automatic draining of condensation water
- Container for the recovery of condensation water
- Oil-free compressor compatible with air purifier
- Dry air after outlet, dew point: < -40°C
- Air outlet connector (to the air purifier): 1/4" Swagelok
- Outlet pressure: 5 bar
- Voltage: 120 or 230 Vac

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