

AMA Instruments GmbH

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Monitoring of organic compounds

Online gas chromatograph – GC 5000 PROCESS

Versatility in industrial and process monitoring applications

The GC 5000 PROCESS has been developed for demanding applications and operation under harsh conditions in process and industrial installations. The analyzer allows for continuous monitoring of organic compounds in air and gas streams. Due to its modular design the GC 5000 PROCESS can be configured individually according to any specific requirement.

The temperature programmable air-bath oven is suitable for installation of either packed or capillary columns. The temperature program with up to three linear heating ramps allows optimizing the chromatographic conditions providing excellent peak separation. A choice of various sample loops, enrichment modules, column switching assemblies and detector types are available in order to perform monitoring of organic compounds in concentrations ranging from percent down to ppt levels.

Additional system modules complement the GC 5000 PROCESS providing complete monitoring solutions. Any module features its own intelligent control electronics and allows for data transfer to the analyzer via internal bus communications. Thus each monitoring system can be configured according to the specific requirements covering a wide range of industrial and process monitoring applications.

Powerful control software

The GC 5000 PROCESS features powerful analyzer control software with integrated 32-bit data chromatography system. The intuitive user interface allows for easy operation and setup of the analyzer. Furthermore the software has proven to run extremely stable in unattended operation mode.

The analyzer software allows controlling and observing the instrument remotely via Ethernet or modem communications. All data and status messages can be transmitted via analog and digital I/O's or serial communications using common standard protocols.

A display and control panel will optionally be available and allows for intuitive touch screen operation providing direct access to all maintenance and diagnostic functions. All parameters and analytical methods can be edited in a convenient manner. The actual operating status of the analyzer as well as chromatograms and results will be displayed on the color screen.

Extensive safety features

All system parameters of the GC 5000 PROCESS will be observed continuously. Any deviation from normal operation will be recorded and stored into a log file. In case of serious malfunctions or instrument failures an error message will be transmitted immediately. Therefore the gas chromatograph meets the highest demands for safe and unattended operation.

To ascertain proper analyzer operation, each controller as well as the operating system and the software will continuously be observed. In case of a system crash the computer will automatically reboot and the gas chromatograph starts in a self-acting manner the next analysis cycle.

Range of applications

- Emissions and immissions monitoring
- Determination of ethylene, propylene, 1,3-butadiene and other components
- Continuous monitoring of waste air in drying and distillation plants
- Determination of halogenated hydrocarbons such as vinyl chloride, methylene chloride, CFC's and others
- Monitoring of aromatic hydrocarbons (benzene, toluene, etc.)
- Monitoring of mercaptanes in ambient air, landfill gas or natural gas
- Determination of volatile organic compounds (VVOC's and VOC's)
- Monitoring of harmful and toxic compounds such as epichlorhydrine, methylene chloride, methylisocyanate and others
- Monitoring of industrial processes and plants
- Occupational health and safety monitoring
- Determination of pollutants and noxious organic compounds in waste air and exhaust gases
- etc.

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TECHNICAL DATA

General

Enclosure	19" plug-in case
Height	6 height units
Depth	600 mm
Weight	appr. 33 kg
Mounting	designed for cabinet/rack mounting, telescopic slide mounting recommended
Ambient temperature	0°C to 40°C
Humidity	5% to 95% relative humidity, non-condensing
EMC	CE-marking, conformity with EMC-guideline 89/336/EEC

Instrument supply

Power supply	220 - 250 VAC, 110 -120 VAC (optional)
Line frequency	50 - 60 Hz
Power consumption	max. 800 W
Carrier gas	N ₂ , GC grade, min. 3 bar
Supply gases	Combustion air, GC Grade, min. 3 bar (for FID only) H ₂ , GC Grade, min. 3 bar (for FID only)
Supply connections	1/8" bulkhead union
Pressure control	Integrated pressure regulators, electronic readout of carrier gas pressure, manometers for indication of supply pressures (for FID only)

Sampling

Sampling	Low-maintenance membrane pump for automated sampling
Sampling control	Electronic monitoring of sample gas line during sampling
Sample volume	Sample loop – 20 to 2000 µl Enrichment module – up to 1000 sccm (adjustable)

Valve oven

Oven liner	Stainless steel
Internal dimensions	H 210 mm x W 80 mm x D 55 mm
Heated valve block	Temperature controlled, adjustable from 30-150°C
Sample valve	6-Port VALCO valve, electrically actuated

Column oven

Oven liner	Stainless steel
Internal dimensions	H 210 mm x W 210 mm x D 55 mm
Stripping column	Optionally available – depending on application
Analytical column	Packed or capillary column – depending on application
Heating	Forced air
Temperature range	40°C to 210°C
Temperature control	Closed loop PID, setpoint resolution 1°C
Temperature program	3 linear heating ramps, 4 isothermal holds
Heating rate	1 °C/min to 25 °C/min, setpoint resolution 1°C/min
Oven cooling	Fast cooling down time due to forced air cooling

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Detector (select one type)

FID	<p>FID – Flame Ionization Detector</p> <ul style="list-style-type: none">• Stable signal output due to temperature controlled detector block• Make-up gas connection provides enhanced detection sensitivity• Linearity of the FID > 10⁷• Amplifier output 0-5 VDC• Requires H₂ and combustion air supply
PID	<p>PID – Photo Ionization Detector</p> <ul style="list-style-type: none">• Electrode-less, radio frequency excited UV lamp provides increased UV intensity and extended lifetime of lamp• Stable signal output due to temperature controlled detector block• Amplifier output 0-5 VDC

Communication

Communication ports	2 x Ethernet, RS232, RS485, 4 x USB, PS2, VGA
I/O-modules	<p>Various I/O modules optionally available providing</p> <ul style="list-style-type: none">• programmable analog outputs, 4-20 mA / 0-5 V / 0-10 V• digital outputs for analyzer status messages, errors, alarms, sample line allocation, etc.• digital inputs for remote control of analyzer

Options

- Display and control panel with intuitive touch-screen operation
- Various I/O modules with 4, 8 or 16 analog outputs (4-20 mA / 0-5 V / 0-10 V) and digital I/O's
- Calibration gas selector (sample, cal1, cal2)
- Single-stage enrichment module for monitoring of organic compounds $\geq C_4$ in the ppt-range
- Dual-stage enrichment module for monitoring of organic compounds from C₁-C₆ in the ppt-range
- Stripping column device for retention and back flushing of high boiling organic compounds and/or humidity
- Combustion air supply for FID (dry-running compressor with exchangeable charcoal filter)

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