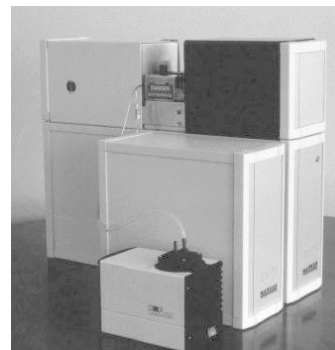
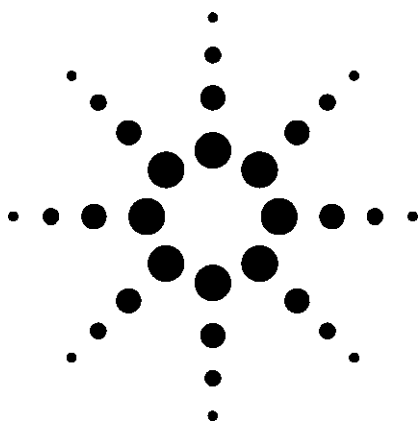


Markes International Air Server™/MCS06/08™ Specifications



The UNITY(e)™ Thermal Desorber is designed to analyze single, standard sample tubes. The Air Server/MCS06/08 accessories connect to UNITY(e) and extend the compatible sample range to include whole-air and gaseous phase samples – for example, continuous monitoring of air/gas streams or samples collected in whole-air containers such as canisters or Tedlar bags.

Tubes can still be desorbed using a UNITY(e) configured with these accessories and, for the greatest sample source versatility; both ULTRA™ (the 100-tube autosampler) and Air Server/MCS06/08 can be permanently configured on the same UNITY(e) TD platform.

The selected gas stream is directed (via the inline dryer if one is fitted) into the UNITY(e) cold trap at a controlled flow rate. This process is fully automated via software. The sample flow path through Air Server/MCS06/08 is at ambient temperature as standard; however, variants of the Air Server offering elevated temperature sample inlets are available as specials.

Sampling times and flows are entered by the user as online method parameters. During the ‘sampling phase’, UNITY(e)’s cold trap is kept cool and volatiles from acetylene to n-C₁₆ can be quantitatively sampled and retained. (n-C₁₆ is the upper limit for the ambient temperature sampling channels; less volatile compounds may be sampled if an elevated temperature option is requested.)

If the sample/standard gas is pressurized (>10 psi), the sampling flow is driven by this pressure. If the sample is at low (<10 psi), atmospheric or sub-atmospheric pressure, a pump (p/n U-ASPM1 (115V) or U-ASPM2 (230V)) is required to ‘pull’ the gas-phase sample through the flow path and focusing trap.

At the end of sampling and after a purge of carrier gas to eliminate air, the UNITY(e) focusing trap heats ballistically to transfer the compounds of interest to the analytical system and trigger the measurement cycle. Collection of the next sample can begin, if required, as soon as the cold trap has re-equilibrated at its trapping temperature.

Key Applications Areas Include:

- Continuous online measurement of C₂ to C₁₀ hydrocarbons (ozone precursors) in ambient air using UNITY(e)-Air Server/MCS06/08 with gas chromatography-flame ionization detection (GC-FID)
- Process monitoring of trace level volatiles in CO₂ using UNITY(e)-Air Server/MCS06/08 with process MS (mass spectrometry)
- Process monitoring of aroma during food and beverage production using UNITY(e)-Air Server/MCS06/08 combined with electronic nose technology, with or without parallel analysis by GC (/MS) gas chromatography/mass spectrometry
- Analysis of canisters of air contaminated with “Air Toxics” per US EPA Methods TO-14/15.

Air Server/MCS06/08 Features

- An electronic mass flow controller (MFC) controls the flow of sample gas. Set and actual sampling flows are displayed and continuously updated in the software. (Note that although an inert, nonemitting



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device was selected, the MFC is down-stream of (located after) the cold trap and does not come into contact with the sample until after it has passed through the focusing trap)

- Inert switching valves
- Inert interface to directly link the accessory to UNITY(e)
- Selection between three, six, or eight inlet ports (depending on the accessory). Note that a minimum of three lines is required to accommodate sample, calibrant, and zero air.
- Compatible with gas-phase samples ranging in pressure from just below atmospheric to 50 psi

Predesorption Checks and Controls

When a system is configured for Air Server/MCS06/08 operation by selecting Air Server in the Options section of the control software, the only 'mode' displayed in the top left hand corner of the desorption method page will read 'On-line Air'.

Online desorption methods allow for the selection or deselection of the pump or dryer accessories (as required) for different samples (see below).

Note that selection of 'pump' or 'dryer' by checking the appropriate boxes in the desorption method will only be effective if the appropriate accessories were installed (note that the MCS06/08 accessory is not able to operate the pump).

- Selection of carrier-gas type: Three carrier-gas options – He, H₂, N₂ are available as standard and are user-defined in the software.
- All split and purge flows are under electronic mass flow control and are settable

between 5 and 100 mL/min. Higher ranges (for example, 20 and 500 mL/min) are available on request

- Leak test: given that UNITY(e)-Air Server/MCS06/08 systems are commonly used in a continuous or semicontinuous sequence by recycling or linking methods and, given that there is no need to break into the sample flow path to change a tube between samples, the leak test is optional in online mode.
- Prepurge: This ensures that individual sample lines leading up to the Air Server/MCS06/08 plus the entire flow path inside the system (~0.6 mL without the optional dryer, ~2 mL with the dryer) are swept with the current sample before the beginning of sample collection. This allows accurate metering of a volume of sample during the sample collection phase without either contamination from previous samples or dilution by carrier gas. The mass flow controller controls the prepurge flow to that set for sampling. The prepurge flow is all directed to the split line, past the inlet to the cold trap. However, no sample gas is allowed to pass into the cold trap.
 - Ambient purge time 0 to 99.9 minutes
 - Settable in 0.1 minute increments
- Trap purge time: This relates to purging the cold trap with carrier gas after sample collection and before the trap is desorbed. It is analogous to the ambient temperature purge of the tube before desorption. For the first 0.2 minutes (12 seconds) of trap purge time, the trap purge flow is all directed to

the split line to prevent carry-over. After the first 12 seconds, the trap purge flow is directed through the cold trap to sweep any remaining O₂ or other residual sample matrix gas from the trap before desorption.

- Ambient purge time 0 to 99.9 minutes
- Settable in 0.1-minute increments
- Trap purge flow: the same trap purge flow will be maintained whether the trap purge flow is passing to split or trap.
 - Range 5 to 100 mL/min. Higher ranges (for example, 20 and 500 mL/min) are available on request
- Inlet selection: three, six, or eight sample-inlet options are available depending on the accessory chosen.
- Sample time: after the leak test (if selected) and after the prepurge, the flow of sample air/gas is directed to the electrically-cooled trap of UNITY(e) for this time period.
 - Range 0 to 99.9 minutes
 - Settable in 0.1 minute increments
- Sample flow: this determines the flow of sample air/gas into the cold trap for the sampling time. It is controlled by the mass flow controller and is independent of the pressure of the sample.
 - Range 5 to 100 mL/min. Higher ranges (for example, 20 and 500 mL/min) are available on request
- Sample gas selection: a choice of five common sample gas matrix types is available to the user – air, helium, carbon dioxide, nitrogen, and hydrogen.

- Cycle time: Entry of an analysis cycle time allows collection of the next sample to overlap the analysis of the previous sample. The cycle time parameter defines the interval between the start of each sample collection time. Setting a cycle time means that the start of collection of another sample may be delayed by the system for some time after the cold trap has recooled to its trapping temperature. System software uses the cycle time parameter to calculate when sample collection of a subsequent sample should begin such that the GC analysis of the previous sample will be complete and the GC system ready again, just before the cold trap is ready to desorb with the next sample.

Automatic Sequencing of Whole-Air/Gas Analyses

- The two most common applications for automation in online mode are:
 - Semicontinuous measurement of trace-level organics in a gas stream or air manifold with calibration and zero gas introduction at user-defined frequencies
 - Automatic sequencing between different whole-air/gas-sample lines or containers
- Programming a sequence: a series of analyses is programmed using the sequence table in an analogous way to a multitube sequence using ULTRA. The start of each new sample collection time can be programmed to begin as soon as the trap has recooled to its trapping temperature, at a fixed-time interval or at an absolute time – for example, 12.00, 1.00, 2.00, etc.

Automatic Sequencing of Inlets

A sequence of samples (gas/air streams, canisters, bags, or other whole air/gas containers) comprising several ‘sets’ may be entered by the user into the sequence table on the user interface on the PC. Individual samples/sample channels may be included in more than one set in a sequence.

A set normally comprises a series of samples which are to be analyzed by the same method. Multiple (up to 100) analyses may be carried out on each individual sample. An entire sequence can be recycled as many times as required.

Individual samples may be identified as calibrant, blank, sample or by any user-defined name.

A log file is produced as a sequence progresses and is automatically maintained and saved. Any sequence deviations are recorded in the log file. If any deviations occur in a sequence, the GC run is initiated to keep the analytical system ‘in synch’ with the desorber. Sequences may be stored and recalled for reuse if necessary.

Dimensions and Weight

- Three-channel system
 - Height: 26.3 cm (10.4 in)
 - Width: 12 cm (4.7 in)
 - Depth: 25 cm (9.8 in)
 - Weight: 3 Kg (7 lb)
- Six- or eight-channel system
 - Height: 26.3 cm (10.4 in)
 - Width: 12 cm (4.7 in)
 - Depth: 50 cm (19.7 in)
 - Weight: 3 Kg (7 lb)

Environmental Conditions

- Ambient operating temperature 0 °C to 40 °C
- Ambient operating humidity 5% to 95% RH noncondensing

Power Requirements

- 85V to 253V, 47/63 Hz, 600VA

Heat Output During Operation

- Power supply unit rated to 25W

Safety and Regulatory Certifications

Conforms to the following safety standards:

- UL1950
- CSA22.2 No. 950
- EN60950
- IEC60950
- CE marked for LVD
- Type Approved for IEC 61010-1
- EN61010-1
- EN60601-1

Conforms to the following regulations on Electromagnetic Compatibility (EMC) and Radio Frequency Interference (RFI):

- EN55022 Class B 1987

Designed and manufactured under a quality system registered to ISO 9001.

Data System – Minimum PC Specification

As for UNITY(e), except that two serial ports are required: one for UNITY(e) and one for the Air Server/MCS06/08 accessory. Note that a USB to serial conversion cable can be used if insufficient serial ports are available on the control PC. However, please note that Windows NT® and 95 do not support USB.

Air Server/MCS06/08 Software

If the Air Server/MCS06/08 is to be added to an existing UNITY(e) installation, the accessory is shipped with a new set of Markes International Thermal Desorption Control Software. This software will replace the existing software used to operate UNITY(e) (or ULTRA-UNITY(e)) as a standalone device.

Before installing the software upgrade, any older versions of the UNITY(e) software must be completely uninstalled from the PC. Instructions for this are supplied with the software and are included in the Operators Manual.

Electrical Connections

As well as the standard connections included with UNITY(e), the Air Server/MCS06/08 is shipped with its own power lead and RSC-232 PC cable.

Air Server/MCS06/08 Options

- Pump U-ASPMP1/2: if the sample/standard gas is pressurized (>10 psi), the controlled flow through the entire system is driven by this pressure. If the sample is at low (<10 psi), atmospheric or just below atmospheric pressure, a pump (115/230V) is required to 'pull' the gas-phase sample through the system
 - The pump includes a power cord to connect to the Air Server, silicone rubber tubing, and a copper tube adapter.

- Inline dryer U-ASDRY: (optional item required for monitoring ultravolatile, apolar compounds in humid atmospheres). The dryer requires a pressure regulated (~15 psi) supply of around 200 mL/min dry air or nitrogen with a dew point below -35 °C (as required for UNITY(e)). Note also that appropriate fittings will be required to connect the regulated dry-gas supply to the 1/8-inch copper tubing provided
- ULTRA U-ULTRA 100-tube autosampler. Note that both Air Server and ULTRA may be installed onto the same UNITY(e) although only one autosampler may operate at any one time.

For More Information

For more information about our products and services visit our Web site at:
www.agilent.com/chem/air

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