



5· Gas Handling & Purification

GIBNIK DIGITAL FLOWMETER FOR GAS CHROMATOGRAPHY

Accurate and repeatable gas flow measurement is fundamental to obtaining good results from your Gas Chromatography. The traditional Bubble Flowmeter, relying as it does on the reaction time of the operator, is a potential source of error.

GIBNIK Flowmeter (REF: KNK-319-990) eliminates this source of error and makes gas flow measurement easier and more accurate. In addition, traceability to the internationally recognised UK National Physical Laboratory (NPL) standards also helps with the performance of Standard Operating Procedures (SOP's) and GLP compliance.



GIBNIK MODEL 6000 SOLID STATE FLOWMETER

6000 SOLID STATE FLOWMETER

The GIBNIK Digital Solid State Flowmeter provides, as standard, measurement of eight different gases, detailed in the specification. In addition it provides the following:

Split Flowrate

The column flow is measured followed by the flow through the split line. Simultaneous displays of column flow, split line flow and split ratio are displayed.

Linear Velocity

The user selects a column diameter from the list provided and then the linear velocity is calculated and displayed. The result is simultaneously displayed with the flowrate so that the operator can view them both and independently set either parameter.

Calibration

This provides, as standard, for eight common gases used in gas chromatography. A calibration certificate is supplied with each flowmeter and re-calibration is recommended annually.

TECHNICAL SPECIFICATIONS OF THE GIBNIK DIGITAL FLOWMETER

P/N: KNK-319-990

Range: 0.1 to 500 ml/min

Resolution: 0.1 ml/min

Accuracy: Typically better than $\pm 2.5\%$ of reading

Gases: As Standard: Air, Argon, Argon/5% Methane, Carbon Dioxide, Helium, Hydrogen, Nitrogen, Oxygen

Display Modes: Flowrate (ml/min)

Linear Velocity (cm/sec)

Split Flow (ml/min)

Split Ratio

Power Supply: One MN1604 Battery (included)

Dimensions: 9 cm(W)x4 cm(D)x16 cm(H)

Description

GIBNIK Digital Flowmeter

Item No.

KNK-319-990

FLOWMETERS & CONTROLLERS

Soap Bubble Flowmeters

Simple to use; just measure the time it takes a soap film to travel between two calibration marks with a stopwatch. Soap Bubble Flowmeters are made from borosilicate glass. All are graduated in milliliters, except the 50 mL flowmeter, which has marks at 0,25 and 50 mL, and the Triple Stage Flowmeter. Flowmeters are supplied with a rubber bulb for the soap solution, rubber tubing, and an instruction sheet. Snoop® liquid leak detector can be used as the bubble solution (not included).

Description	Item No.
1 mL Soap Bubble Flowmeter	AUC261301
10 mL Soap Bubble Flowmeter	AUC261310
25 mL Soap Bubble Flowmeter	AUC261325
50 mL Soap Bubble Flowmeter	AUC261350

Replacement Parts and Accessories

Replacement Bulb, for 1 or 10 mL	AUC261335
Replacement Bulb, for 25 mL	AUC261337
Replacement Bulb, for 50 mL	AUC261338
Snoop Leak Detector	AUC205300



25 mL Soap Bubble Flowmeter

Triple Stage Flowmeter

This uses three different volume regions (1 mL - 10 mL - 100 mL) that allow measurement of gas flow rates from 0.5 to 500 mL/min. It comes complete with rubber bulb and soap solution, ring stand and clamp sold separately.

Description	Item No.
Triple Stage Flowmeter	AUC261390



Triple Stage Flowmeter



AUC205300

Snoop® Leak Detector

Snoop is specifically formulated for better and longer bubbling to indicate leaks. A 30 cm long tube permits application in hard-to-reach places. Snoop is non-toxic, non-flammable and leaves no residue. Supplied 236 mL in a plastic squeeze bottle.

Description	Item No.
Snoop Leak Detector	AUC205300

Nupro® Needle Valves

Nupro Fine Metering Valves give extremely fine flow control in the 0 to 400 cc/min flow range with up to 6.9 bar (100 psi) line pressure. The Nupro Valve has a knurled handle that is adjusted to the desired flow, with no backlash. Eight to ten full turns opens the valve to maximum flow. This valve can be panel mounted, and is available for use with 1/8" or 1/4" tubing. Needle valves are not recommended for shutting off flow, use toggle valves instead.



AUC264125

Description	Item No.
1/8" Straight Pattern, Brass	AUC261125
1/8" Angle Pattern, Stainless Steel	AUC264125
1/4" Straight Pattern, Brass	AUC261250
1/4" Angle Pattern, Brass	AUC263250
1/4" Angle Pattern, Stainless Steel	AUC264250

Rotameter

The Rotameter is an adjustable, direct-reading flowmeter. Because it is direct reading, no calibration charts are needed, and each Rotameter is calibrated for a particular gas, with +/- 5% accuracy. Repeatability is +/- 0.25%. Flow tubes are 65 mm long and have a minimum pressure rating of 13.8 bar (200 psi). They can be panel mounted, or used on a bench top with the optional stand. The Triple Rotameter is useful for FIDs and is calibrated for either He or N₂ as the carrier. Gas flow of 1/10th the maximum flow is necessary to raise the indicating ball. Fittings are 1/8" female NPT.



AUC261202

Description	Maximum Flow	Item No.
Single Rotameter for H ₂	100 mL/min	AUC261201
Single Rotameter for He	65 mL/min	AUC261202
Single Rotameter for N ₂	50 mL/min	AUC261204
Triple Rotameter for H ₂ , N ₂ , Air	100/50/500 mL/min	AUC261203
Triple Rotameter for H ₂ , He, Air	100/65/500 mL/min	AUC261205
Tripod Stand for Single Rotameter		AUC261207

Porter Flow Controller

This controller provides constant low gas flow regardless of the pressure down stream. This allows gas flows to be kept constant through a GC column as the temperature and back pressure increase. The flow rate is linear over a range of 14 full turns of the knob. The Porter Flow Controller is made from aluminum, with an o-ring made of Viton® and a stainless steel diaphragm. Both models include a replaceable inlet filter. Maximum inlet pressure is 17 bar (250 psi), while the minimum pressure is 1 bar (15 psi) higher than the system back pressure. Flow precision is 0.3%, and it comes with 1/8" fittings. The Flow Controller is available in ranges of 0 - 110 cc/min for packed columns, and 0 - 10 cc/min for capillary columns.

Description	Item No.
Porter Flow Controller, 110 cc/min	AUC265110
Porter Flow Controller, 10 cc/min	AUC265010



AUC265110

Inline Particulate Filter

These Parker A-Lok® filters remove small particles from carrier gas and FID streams, to protect fine metering valves or sampling valves from internal damage. 5 micron filter element. They are available in brass or stainless steel; maximum pressure is 68 bar (1000 psi).

Description	Item No.
1/8" Filter, Brass, 5 µm	AUC2A-F2L-5-B
1/8" Filter, Stainless Steel, 5 µm	AUC2A-F2L-5-SS

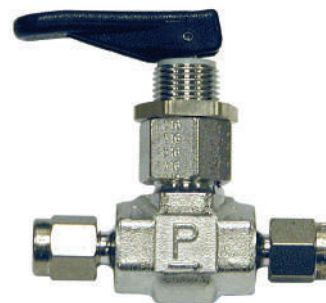


AUC2A-F2L-5-B

On-Off Toggle Valve

Toggle valves are the preferred method for shutting off low-pressure gas at the point of use, and are particularly useful when multiple instruments are run from a single source. The sealing surfaces are made from PTFE to assure gas purity. The handle flips up 90° and latches in the open position. Maximum pressure is 17 bar (250 psig).

Description	Item No.
1/8" Toggle Valve, Brass	AUC2A-V4LQ-B
1/8" Toggle Valve, Stainless Steel	AUC2A-V4LQ-SS
1/4" Toggle Valve, Brass	AUC4A-V4LQ-B
1/4" Toggle Valve, Stainless Steel	AUC4A-V4LQ-SS



AUC2A-V4LQ-SS

REGULATORS

Two-stage regulators



KNK-319-902

These are high-purity two-stage regulators for more accurate pressure regulation; recommended for GC applications. Maximum inlet pressure is 200 bar (3000 psig). Maximum outlet pressure is 8.5 bar (125 psig). The outlet is 1/8" compression fitting for use with 1/8" OD tubing (may be removed for 1/4" female NPT).

Description	Item No.
High Purity Regulator for Hydrogen	KNK-319-902
High Purity Regulator for N2	KNK-319-903
High Purity Regulator for He	KNK-319-904
High Purity Regulator for Air	KNK-319-905



KNK-319-920

Manifold

Description	Item No.
4 Gases Regulation Manifold	KNK-319-920

Copper Tubing

Standard grade; it should be cleaned before use in gas lines.

Description	Item No.
1/8" x 0.065"	AUC432002
1/4" x 0.190"	AUC432003



Copper Tubing

Copper Tubing, Pre-Cleaned

Recommended for carrier gas lines. Tubing is cleaned by solvent rinse, then baked under inert gas flow.

Description	Item No.
1/8" x 0.065"	AUC432002
1/4" x 0.190"	AUC432003

Polypropylene tubing

Recommended for any gas lines.

Description	Item No.
Polypropylene tube 1/8" OD, 0.080" ID	31POL010830

GAS SAMPLING

Stainless Steel Sampling Cylinder

- Store high-pressure samples safely
- Sturdy construction for on-site use
- Type 304 Stainless Steel
- 6.8 bar (100 psi) maximum pressure with sampling port
- 68 bar (1000 psi) maximum pressure without sampling port

These seamless stainless steel cylinders allow easy field sampling of high-pressure gases, for sample integrity and safe transportation back to the lab. Two options are available for the end valves

1. Needle Valves - High-flow needle valves at each end control the sample inlet and outlet. The soft Kel-FTM seal requires only light tightening for a high-pressure, leak-tight seal. Valve materials are 316 stainless steel, Kel-F and PTFE. Outlets are 1/4" female NPT. 68 bar (1000 psig) maximum pressure.

2. Needle Valve / Needle Valve with Sampling Port - Needle valves are the same as above. A Mininert® valve is in-line between the sample cylinder and one valve, to allow syringe needle penetration directly into the cylinder for sample withdrawal or gas standard preparation. 6.8 bar (100 psig) maximum pressure.

Description	Volume	Item No.
Sampling Cylinder with Valves & Port	75 cc	AUC410315
Sampling Cylinder with Valves	150 cc	AUC410320
Sampling Cylinder with Valve & Port	150 cc	AUC410325
Sampling Cylinder with Valves	500 cc	AUC410330
Sampling Cylinder with Valves & Port	500 cc	AUC410335
Sampling Cylinder with Valves	2250 cc	AUC410350



AUC410335

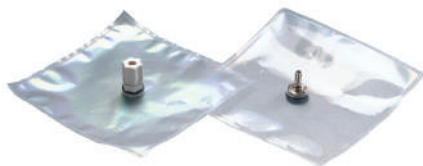
Gas Sampling Bulbs

- Borosilicate glass for low surface activity
- Suitable for low-pressure (atmospheric) storage of gas samples prior to analysis
- Bulbs have septum ports for easy access by syringe needle through a standard cylindrical septum

Description	Volume	Item No.
Gas Sampling Bulbs with Septum Ports		
Gas Sampling Bulb, PTFE Stopcock	125 mL	AUC410001
Gas Sampling Bulb, PTFE Stopcock	250 mL	AUC410002
Gas Sampling Bulb, PTFE Stopcock	500 mL	AUC410003
Gas Sampling Bulb, PTFE Stopcock	1000 mL	AUC410004



Gas Sampling Bulb with Septum Port



Sampling Bags

Gas Sampling Bags

Available in four port configurations. Dual ports are placed on opposite sides.

- Polypropylene Fitting - has removable ferrule; use with included septum or 1/4" tube
- Halkey Roberts Valve - twist the barb to open / close
- Dual Valves - Halkey Roberts and Polypropylene Fitting, for use with septa or 1/4" tube.
- Dual valves recommended; fill the bag through the Halkey Roberts Valve; then withdraw sample through the septum

**All bags have a 10 bag minimum order.*

Tedlar® Sampling Bags, 0.05 mm Thickness

Recommended for collecting organic vapors, such as automotive or plant gas emissions. Tedlar has low permeability and can be used for most applications.



Polypropylene Fitting for Septum or Tube

Size	Volume	PP Fitting Septa/Tube	On/Off Halkey-Roberts	Two Ports Halkey-Roberts & PP Septa/Tube
6" x 6"	0.6 L	AUC410100-1	AUC410100-2	AUC410100-4
9" x 9"	1.6 L	AUC410101-1	AUC410101-2	AUC410101-4
12" x 12"	3.8 L	AUC410102-1	AUC410102-2	AUC410102-4
7" x 22"	3.8 L	AUC410103-1		
15" x 15"	8.1 L	AUC410105-1	AUC410105-2	AUC410105-4
18" x 18"	20.3 L	AUC410106-1		AUC410106-4
18" x 34"	53 L	AUC410109-1		
24" x 24"	37.7 L	AUC410108-1		
24" x 36"	73 L	AUC410110-1		AUC410110-4



On-Off Halkey-Roberts

PTFE Sampling Bags, 0.13 mm Thickness

Have an inertness of PTFE and are recommended for atmospheric ozone and acid gas collection.

Size	Volume	PP Fitting Septa/Tube	On/Off Halkey-Roberts
6" x 6"	0.6 L	AUC410200-1	AUC410200-2
9" x 9"	1.6 L	AUC410201-1	AUC410201-2
12" x 12"	3.8 L	AUC410202-1	AUC410202-2
7" x 22"	3.8 L	AUC410203-1	AUC410203-2
15" x 15"	8.1 L	AUC410205-1	AUC410205-2
18" x 18"	20.3 L	AUC410206-1	AUC410206-2
24" x 24"	37.7 L	AUC410208-1	AUC410208-2
24" x 36"	73 L	AUC410210-1	AUC410210-2

Gas Permeability of Sampling Bags

0.05 mm for Tedlar; 0.13 mm for PTFE

cc/ (100 sq. in) (24 hrs) (atm)

Gas	Tedlar	PTFE
CO2	5.6	334
Hydrogen	29	440
Nitrogen	1.3	64
Oxygen	1.6	150

grams/ (100 sq. in) (24 hrs)

Vapor	Tedlar	PTFE
Water	0.014	0.090
Hexane	0.004	0.11

Replacement Septa

Description	Item No.
Replacement Septa for PP fitting, 12/pk	AUC410125

Gas Sampling Bags & Tubing

Metallized-Film Gas Sampling Bags

- Impermeable aluminum film layer
- Each bag is individually leak tested

These are made from a five-layer composite material consisting of nylon/aluminum/ polyethylene with adhesive on both sides of the aluminum. The polyethylene contacts the gas sample, for purity and chemical inertness. These bags are recommended for auto emissions and other samples that need storage before analysis. Bags come with two ports: Halkey Roberts valve and polypropylene Septa/Tube fittings.

**All bags have a 10 bag minimum order.*



Metallized-Film Gas Sampling Bag

Description	Volume	Two Valves Halkey-Roberts & PP Septa/Tube
6" x 6"	0.6 L	AUC410300-4
9" x 9"	1.6 L	AUC410301-4
12" x 12"	3.8 L	AUC410302-4
7" x 22"	3.8 L	AUC410303-4
15" x 15"	8.1 L	AUC410305-4
18" x 18"	20.3 L	AUC410306-4
18" x 34"	53.0 L	AUC410309-4
24" x 24"	37.7 L	AUC410308-4
24" x 34"	73.0 L	AUC410310-4

GAS PURIFIERS

Product	Contaminant Removed Capacity, g	Output Purity ppbv	Total Adsorbent Volume, cc	Product Size/Weight cm; kg	Shipping Size/Weight cm; kg
Cartridge Systems - 13.8 bar maximum (200 psi)					
Gas Purification Kit	Oxygen, 1.1	< 1	225	30 x 5 x 5; 1.7	47 x 21 x 11; 2.6
	Water, 12	< 20			
	Hydrocarbons ¹ , 8	< 2			
All-In-One ²	Oxygen, 0.6	< 1	200	31 x 12 x 8; 1.3	44 x 14 x 13; 1.6
	Water, 13	< 100			
	Hydrocarbons ¹ , 4.7	< 1			
Inline Filters - 13.8 bar maximum (200 psi)					
ZPure™ Dual ²	Oxygen, 0.8	< 5	125	29 x 3 x 3; 0.5	29 x 4 x 4; 0.6
	Water, 12	< 20			
ZPure H ₂ O	Water, 15	< 20	125	29 x 3 x 3; 0.5	29 x 4 x 4; 0.6
ZPure HC	Hydrocarbons ¹ , 10	< 5	125	29 x 3 x 3; 0.5	29 x 4 x 4; 0.6
ZPure O ₂ ²	Oxygen, 3.2	< 5	125	29 x 3 x 3; 0.5	29 x 4 x 4; 0.6
Inline Filters - 6.9 bar (100 psi)					
Indicating Oxygen	Oxygen	< 100	8	26 x 3.2 x 3.2; 0.2	30 x 4 x 4; 0.3
Safe Glass Moisture	Moisture, 6	< 50	55	26 x 3.2 x 3.2; 0.3	30 x 4 x 4; 0.4
Model 100	Moisture, 3	nd	55	26 x 3.2 x 3.2; 0.3	30 x 4 x 4; 0.4
	Hydrocarbons ¹ , 2.6	nd			
Gas Dry Filter Trap	Moisture/Oil/Dust, 15	nd	125	33 x 4 x 4; 0.4	37 x 5 x 5; 0.6
Big Trap	Moisture/Oil/Dust, 50	nd	400	43 x 6 x 6; 1	47 x 7 x 7; 1.2
Inline Filters - 69 bar maximum (1000 psi)					
Model 1000 ²	Oxygen, 3.5	< 10	500	37 x 5 x 5; 1.2	40 x 6 x 6; 1.4
Model 500	Water, 63	< 20	500	37 x 5 x 5; 1.2	40 x 6 x 6; 1.4
Model 300	Hydrocarbons ¹ , 45	< 1	500	37 x 5 x 5; 1	40 x 6 x 6; 1.2
Carbon Dioxide Trap	Carbon Dioxide, 100	nd	500	37 x 5 x 5; 1.3	40 x 6 x 6; 1.2

1. Pentane and heavier hydrocarbons. Adsorption capacity and breakthrough volumes vary depending on the compound.

2. Special shipping restrictions apply.

Advanced Filter System

All New Advanced Filter System

- Two visible indicators for oxygen and water
- All metal and glass construction
- High capacity and efficiency in a single cartridge
- Expected life of 1 year or more in typical use with up to four GCs
- Safety double seal construction, especially using hydrogen gas
- Check valves protect gas lines during cartridge replacement
- Easy cartridge replacement with simple twist on / off knob

Carrier gas contaminants can lead to GC column phase degradation, which can cause interference with your chromatographic results. Common problems resulting from phase degradation are decreased sensitivity and increase in baseline noise.

Innovative Design

Two part system includes a small stainless steel manifold and a high capacity filter cartridge. The manifold can be attached to a laboratory wall or bench with brackets included in the installation kit. It connects to a 1/8" gas line with stainless steel compression fittings.



AFS Cartridge and Bench Mounted Manifold



AFS Wall Mount



AFS Bench Mount



Advanced Filter System

Table 1.
AFS capacity and efficiency levels.

	Capacity	Efficiency
Oxygen	750 cc	< 1 ppb
Water	12 g	< 10 ppb
Hydrocarbons *		< 1 ppb

*Hydrocarbons (C5 and higher) capacity depends on the compound.

The cartridge easily attaches and detaches from the manifold with an assembly knob. To change the cartridge simply twist the knob to disconnect the cartridge from the manifold and slide on a new cartridge; twist the knob back for a tight, secure fit. Check valves open and close automatically during cartridge replacement.

Excellent Capacity and Efficiency in One Cartridge.

The Advanced Filter System has high capacity and efficiency levels for oxygen, water and hydrocarbons (Table 1).

The recommended maximum flow rate is 2 L/min at 200 psi maximum operating pressure. The extremely sensitive moisture and oxygen indicators allow cartridge replacement at the appropriate time, and ensures maximum protection and uninterrupted quality results from your GC instrument.

Safety Double Sealing System

Each connection in the AFS is made with two fluoro-elastomer seals.

In addition, the polycarbonate shield that surrounds the glass indicator section of the filter is sealed, so the gas flow is secure even if the glass is broken (Figure 1).

The redundant sealing system and robust construction provides a new level of security in gas filtration.

Description

Description	Item No.
Gas Purification Kit, 1/8" fittings	KNK-319-910
Replacement Cartridge, Gas Purification Kit	AUC202910
Reconditioned Cartridge*, Gas Purification Kit	AUC202920

*Requires exchange of depleted cartridge.



Figure 1. Polycarbonate shield surrounds the glass indicator.

New ZPure™ Purifiers

- Compact design fits many existing installations that use small aluminum filters
- Stainless steel body with either brass or stainless steel compression fittings
- Oxygen filters use new advanced adsorbent technology



ZPure Dual Purifier

ZPure Dual Purifier

- High capacity - reduces O₂ and water to low ppb levels
- Advanced adsorbent technology
- Compact filter design for use with GC/MS

The GIBNIK ZPure Dual Purifier is a compact filter designed for GC/MS carrier gas lines. It will protect the column's stationary phase from oxygen and water degradation, for improved baseline and sensitivity. It is also recommended for other point-of-use applications that require ultra-pure inert gas. Oxygen and water are removed to low ppb levels from He, Ar, N₂, H₂ or methane, at flow rates up to 2 L/min. Advanced adsorbent technology allows high removal capacities of 600 cc for oxygen and 12 g for water.

Description	Brass	Stainless
ZPure Dual Purifier, 1/8" fittings	AUC202206-B	AUC202206-SS
ZPure Dual Purifier, 1/4" fittings	AUC202207-B	AUC202207-SS

ZPure O₂ Purifier

- High capacity - reduces O₂ to low ppb levels
- Advanced adsorbent technology
- Outstanding efficiency in a small high performance design
- Recommended for GC/MS carrier gases

The GIBNIK ZPure O₂ Purifier provides the same high 2.5 L capacity for oxygen removal as our Model 1000 oxygen trap, with improved efficiency, in a smaller, high performance design. Superior results are made possible with our new advanced adsorbent technology. It will remove oxygen at ambient conditions to low ppb levels from He, Ar, N₂, H₂ or methane at flow rates up to 2 L/min. It is recommended for GC/MS carrier gases to protect the column's stationary phase from oxygen degradation. It may also be used in any application requiring zero-grade oxygen-free gas.

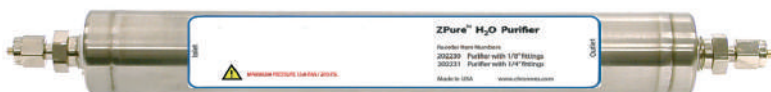
Description	Brass	Stainless
ZPure O ₂ Purifier, 1/8" fittings	AUC202216-B	AUC202216-SS
ZPure O ₂ Purifier, 1/4" fittings	AUC202217-B	AUC202217-SS

ZPure HC Purifier

- High capacity - reduces hydrocarbons to low ppb levels
- Recommended for use with FID gas lines

The GIBNIK ZPure HC Purifier removes C5 weight and heavier hydrocarbons from inert gases, air or hydrogen to low ppb levels. It is recommended for use with FID gas lines to improve baseline noise and sensitivity. Its compact size allows easy positioning for point-of-use operation.

Description	Brass	Stainless
ZPure HC Purifier, 1/8" fittings	AUC202232-B	AUC202232-SS
ZPure HC Purifier, 1/4" fittings	AUC202233-B	AUC202233-SS



ZPure H²O Purifier

ZPure H²O Purifier

- High capacity - reduces moisture to low ppb levels

The GIBNIK ZPure H²O Purifier removes water from inert gases, air or hydrogen to less than 20 ppb at flow rates up to 2 L/min. It has a long lifetime, with capacity for water of 15 g.

Description	Brass	Stainless
ZPure H ² O Purifier, 1/8" fittings	AUC202230-B	AUC202230-SS
ZPure H ² O Purifier, 1/4" fittings	AUC202231-B	AUC202231-SS

All-In-One Gas Purification System

- One cartridge removes oxygen, water and non-methane hydrocarbons
- Maximum purification in a minimum space
- Wall-mount and bench-mount hardware included
- Regenerable; saves time and money



Bench Mount

Wall Mount

The All-In-One Gas Purification System removes trace level contaminants in a single-cartridge system. The system removes oxygen and water to better than research grade levels (< 0.2 ppm). The single cartridge format offers low operating costs and is easily replaced. The purifier consists of a manifold head and multi-sorbent cartridge for efficient removal of water, oxygen, sulfur compounds and hydrocarbons. It is shipped fully activated and filled with high-purity helium. It is available with either 1/8" or 1/4" fittings. Regeneration service is available.

Dimensions are 12 cm x 31 cm x 8 cm.

Weight is 1.3 kg. Replacement cartridge only weighs 0.6 kg.

Construction

The all-welded stainless steel cartridge contains a multiple-layer adsorbent bed to sequentially remove contaminants to trace levels. The system comes ready to wall mount, but may be bench mounted by removing the bracket and attaching to a bench mount base which is included.

Capacity

The All-In-One Gas Purification System has a capacity for oxygen of at least 0.58 g, enough to purify eight 292 cubic feet tanks of 99.997% pure helium, or a larger number of tanks when higher-purity helium is used. Water capacity is about 13 grams to an output level of 100 ppb, while capacity for hydrocarbons is n-butane is 4.7 grams.

Efficiency

The All-In-One Gas Purification System has been shown to remove residual oxygen and water from research grade helium (99.9999% minimum purity). Oxygen is removed to an output concentration of 1 ppb, when measured under test conditions. Water and hydrocarbons (as n-butane) are removed with an efficiency greater than 99.8%.

Warning: Becomes hot when exposed to air, use only with inert, non-oxidizing gases!

Description	Item No.
All-In-One Gas Purification System, 1/8" fittings	AUC202890
All-In-One Gas Purification System, 1/4" fittings	AUC202892
Replacement Cartridge, All-In-One Purifier	AUC202839
Regeneration Service, All-In-One Cartridge	AUC202879

Oxygen Traps

Indicating Oxygen Trap

- High efficiency - reduces O² to less than 0.1 ppm
- Changes color from bright green to gray when adsorption capacity is depleted
- Non-contaminating glass tube

Although intended to serve primarily as an indicator, this compact unit has a capacity of 0.05g of oxygen at STP. The non-contaminating, heavy-walled inner glass tube of catalyst is protected from accidental breakage by the outer plastic tube. Maximum pressure is 6.9 bar (100 psi). Approximate dimensions: 3.2 x 26 cm; weight 0.2 kg. Factory regeneration service is available.

Description	Item No.
Indicating Oxygen Trap, 1/8" fittings	AUC202236-B
Indicating Oxygen Trap, 1/4" fittings	AUC202223
Regeneration Service, 1/8"	AUC202224
Regeneration Service, 1/4"	AUC202225



Indicating Oxygen Trap

Model 1000 Oxygen Trap

- High-capacity - can remove 3.5 g of O²
- Exceptional efficiency - less than 10 ppbv oxygen concentration at the outlet

High capacity oxygen trap, for long term protection of capillary column stationary phases against oxidation at GC operating temperatures. It is also effective for removing sulfur compounds, such as hydrogen sulfide and mercaptans. The Model 1000 is intended for use with non-oxidizing gases such as He, Ar, N₂, H₂ or CH₄, containing less than 1% oxygen. The Model 1000 oxygen trap is a high-pressure metal cylinder filled with 500 cc of active oxygen adsorbent. The adsorbent binds covalently with oxygen; no gas is generated from this reaction. Maximum flow rate for nominal pressure drop is 1 liter/min; maximum pressure is 69 bar (1000 psig). Approximate dimension: 5 x 37 cm with fittings. Weight is 1.2 kg. Regenerable with hydrogen treatment; instructions included. However, we recommend returning to GIBNIK for regeneration. Note that sulfur compounds permanently poison the adsorbent.

Description	Item No.
Model 1000 Oxygen Trap, 1/8" fittings	AUC202200
Model 1000 Oxygen Trap, 1/4" fittings	AUC202202
Regeneration Service, 1/8"	AUC202204
Regeneration Service, 1/4"	AUC202205



Model 1000 Oxygen Trap

All GIBNIK gas purifiers are shipped filled with high-purity helium

**Warning: Becomes hot when exposed to air, use only with inert, non-oxidizing gases!*



AUC202240 AUC202280

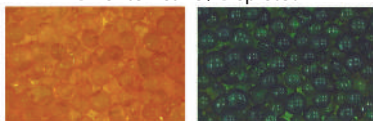


Insert keeps the packing from spilling during cartridge removal, in the Gas-Dry Filter Trap and Big Trap.

Indicator Color Changes



Drierite Active / Depleted



CoFree Active / Depleted



AUC202260, AUC202290



A base plate version is available for both the Big Trap and Gas-Dry Filter Trap with Indicating Drierite.

Moisture / Oil / Dust Traps

- Molecular sieve 5A provides high-efficiency drying
- Moisture indicators warn of leaks in the gas stream
- Cobalt- and phenolphthalein-free indicator is available

Gas-Dry Filter Trap

This contains 120 cc total volume of molecular sieve 5A and moisture indicator in a clear acrylic tube. Available with traditional Indicating Drierite®, or CoFree™ cobalt-free indicator. The trap's o-ring design allows hand-removal of the cartridge without disconnecting the fittings from the line. 6.9 bar maximum pressure (100 psi). Approximate dimensions: 4 x 33 cm. Weight 0.4 kg. For high-efficiency moisture removal we recommend the Model 500. For carrier gas purification we recommend the Advanced Filter System.

Description	Item No.
Gas-Dry Filter Trap, Indicating Drierite, 1/8" fittings	AUC202240
Gas-Dry Filter Trap, Indicating Drierite, 1/4" fittings	AUC202242
Gas-Dry Filter Trap on Base Plate, 1/8" fittings	AUC202248
Gas-Dry Filter Trap on Base Plate, 1/4" fittings	AUC202249
Gas-Dry Filter Trap, CoFree Indicator, 1/8" fittings	AUC202280
Gas-Dry Filter Trap, CoFree Indicator, 1/4" fittings	AUC202282
Regeneration Service	AUC202254

Big Trap

This removes moisture, oil and dust from supply gas before it flows into your FID detector. The Big Trap has a 400 cc total volume of molecular sieve 5A and indicator in a clear acrylic tube. Available with Indicating Drierite or CoFree cobalt-free indicator. Both indicators change color at low relative humidity. Our unique O-ring design allows hand-removal of the cartridge without disconnecting the fittings from the line, while a plastic insert at each end keeps the packing from spilling. Maximum pressure is 6.9 bar (100 psi). Dimensions are 6 x 43 cm including fittings; weight is 1.0 kg. For high-efficiency moisture removal we recommend the Model 500. For carrier gas purification we recommend the Advanced Filter System.

Base Plate: The Big Trap with Indicating Drierite is available on a base plate to bench mount.

Description	Item No.
Big Trap, Indicating Drierite, 1/8" fittings	AUC202260
Big Trap, Indicating Drierite, 1/4" fittings	AUC202262
Big Trap on Base Plate, 1/8" fittings	AUC202258
Big Trap on Base Plate, 1/4" fittings	AUC202259
Big Trap, CoFree Indicator, 1/8" fittings	AUC202290
Big Trap, CoFree Indicator, 1/4" fittings	AUC202292
Regeneration Service	AUC202254

Moisture Traps

Safe Glass Moisture Trap

Gas contacts only glass, metal and the adsorbents for purity. The indicator changes color at low levels of moisture. The Safe Glass Trap is enclosed in a plastic outer sheath for safety.

Because of the internal seal design, refilling is not recommended. The trap can be regenerated at GIBNIK. 55 cc total adsorbents. Maximum pressure is 6.9 bar (100 psi). Dimensions are 3.2 x 26 cm; weight 0.3 kg.

Description	Item No.
Safe Glass Moisture Trap, 1/8" fittings	AUC202266
Safe Glass Moisture Trap, 1/4" fittings	AUC202268
Regeneration Service	AUC202254



Safe Glass Moisture Trap

Model 500 Moisture Trap

- Moisture trap contains molecular sieve 5A for high-efficiency drying
- Recommended for detector support gases and carrier gases

500 cc of molecular sieve in this metal trap reduces moisture to less than 20 ppbv, at instrument flow rates of 1 liter/min or less. Internal frits at each end prevent particle contamination of your instruments. The Model 500 will remove water from over 20 standard cylinders of compressed air. The trap can be regenerated, instructions included. Maximum pressure is 69 bar (1000 psig). Regeneration service is available. Approximate dimensions are 5 x 37 cm with fittings. Weight is 1.2 kg. Mounting clamps are sold separately for attachment to a wall or bench; mounting screws are not included.

Description	Item No.
Model 500, Molecular Sieve Drying Trap, 1/8" fittings	AUC202270
Model 500, Molecular Sieve Drying Trap, 1/4" fittings	AUC202272
Regeneration Service	AUC202254



Model 500 Moisture Trap

Hydrocarbon Traps

Model 300 High Pressure Hydrocarbon Trap

This is a high-pressure metal cylinder filled with 500 cc of activated charcoal. It will remove all hydrocarbons at room temperature except methane, from your FID air and H2 lines, to minimize noise and extraneous peaks in the signal. It is also recommended for use with purge and trap apparatuses, and with GC carrier gases for trace analyses. Frits in each end prevent particulates from entering the gas stream. Maximum pressure is 69 bar (1000 psig). Approximate dimensions are 5 x 37 cm with fittings. Weight is 1.0 kg. Regeneration service is available.

Description	Item No.
Model 300 Hydrocarbon Trap, 1/8" fittings	AUC202330
Model 300 Hydrocarbon Trap, 1/4" fittings	AUC202332
Regeneration Service	AUC202254



Model 300 Hydrocarbon Trap

Model 100 Safe Glass Hydrocarbon Trap

The Model 100 is designed to provide organics-free gas, with an indicator for moisture contamination. The gas contacts only metal or glass for high purity. The Model 100 contains activated charcoal and a moisture indicator; the inner glass tube is protected by an outer tube of clear plastic. Internal stainless steel screens at each end of the trap protect against fines entering the gas stream. Maximum pressure is 6.9 bar (100 psig). Approximate dimensions are 3.2 x 26 cm. Weight is 0.3 kg.

Description	Item No.
Model 100 Hydrocarbon Trap, 1/8" fittings	AUC202340
Model 100 Hydrocarbon Trap, 1/4" fittings	AUC202342
Regeneration Service	AUC202254



Model 100 Hydrocarbon Trap

Split Vent Trap

Split Vent Trap

- Remove organics before they reach the lab atmosphere
- Filled with activated charcoal, a highly-efficient adsorbent
- Attaches to your GC's split vent



Contains 1200 mg of activated charcoal. We recommend weekly or bi-weekly replacement of the charcoal tubes, depending on GC use. The split vent trap consists of glass adsorbent tubes, 1/8" end fittings and a clear plastic protective sleeve. Each trap comes with 3 replacement charcoal tubes. Length 16 cm.

Description	Item No.
Injector Split Vent Trap	AUC202346
Replacement Split Vent Tubes, 3/pk	AUC202348
1/8" PTFE Ferrules, 10/pk	AUC214200
1/8" to 1/16" PTFE Reducing Ferrules, 10/pk	AUC214210

CO2 Trap

Carbon Dioxide Trap



Carbon Dioxide Trap

Remove carbon dioxide from your gas stream with our Carbon Dioxide Trap. High-capacity; it will irreversibly bind 100 g of carbon dioxide (cannot be regenerated). Its unique design uses NaOH blended with molecular sieve to scrub out CO₂. The reaction produces water which is adsorbed by the molecular sieve. When downstream water is a concern we recommend using a second moisture trap in line as a safety measure. Not recommended for GC use. Maximum pressure for the Carbon Dioxide Trap is 69 bar (1000 psig); approximate dimensions 5 x 37cm. Weight is 1.3 kg.

Description	Item No.
Carbon Dioxide Trap, 1/8" fittings	AUC202350
Carbon Dioxide Trap, 1/4" fittings	AUC202352

TUBING & ACCESSORIES

PTFE Tubing



PTFE Tubing

Pure PTFE tubing has many low-pressure fluid transfer uses. It is ideal for HPLC solvent lines.

Description	50' Coil
1/16" x 1/32"	AUC430026
1/8" x 1/16"	AUC430036
1/4" x 3/16"	AUC430046

PTFE Inner-Coated Tubing

Both aluminum and stainless steel tubing are available with a chemically deposited interior coating of PTFE. The coating is free from pinholes and is approximately 0.001" thick. This tubing requires preconditioning at 250°C under inert gas flow for three hours before use.

Description	Length	Item No.
PTFE Lined Aluminum		
1/8" x 0.075"	50' Coil	AUC433002
1/4" x 0.188"	50' Coil	AUC433004
PTFE Lined 304 Stainless Steel		
1/8" x 0.083"	50' Coil	AUC434002
1/4" x 0.208"	50' Coil	AUC434004

Stainless Steel Tubing

GIBNIK provides premium GC/HPLC-grade welded tubing for making custom columns, HPLC connections and other uses. Tubing is suitable for chromatographic use, and has a smooth interior with uniform surface finish.

- **Type 304** - High quality for general purpose use. Recommended for the manufacture of packed GC columns
- **Type 316** - Superior corrosion resistance for special applications



Stainless Steel Tubing

Type 304

OD x ID	50' Coil
1/8" x 0.085"	AUC430015
1/4" x 0.210"	AUC430018

Type 316

1/16" tubing is seamless; 1/8" and 1/4" tubing is welded.

OD x ID	50' Coil	200' Coil
1/16" x 0.010"	AUC430002	AUC430003
1/16" x 0.020"	AUC430005	AUC430006
1/16" x 0.030"	AUC430010	AUC430011
1/16" x 0.040"	AUC430013	

Copper Tubing

Pre-Cleaned - Recommended for carrier gas lines. The tubing is cleaned by solvent rinse, then baked under inert gas flow.

Standard Grade - Standard grade copper tubing is a good low-cost choice for many purposes. It should be cleaned before use in critical applications, such as gas transfer lines.

Pre-Cleaned OD x ID	Standard 50' Coil	50' Coil
1/8" x 0.065"	AUC432002	AUC432001
1/4" x 0.190"	AUC432005	AUC432003



Copper Tubing

Aluminum Tubing

Low cost for general-purpose use; low-pressure gas transfer lines. 50 feet coils.

OD x ID	Length	Item No.
1/8" x 0.075"	50' coil	AUC431001
1/4" x 0.190"	50' coil	AUC431003

TUBING ACCESSORIES

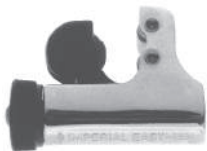
Imp® Tubing Cutter Junior



AUC227-FA

For 1/8" and 3/4" OD tubing. Use this aluminum, copper, brass and thin-wall steel.

Description	Item No.
Imp Tubing Cutter	AUC227-FA



AUC436001

Imp Tubing Cutter

The Imp is ideal for tight spaces; it requires only 1 3/4" swing radius. It will cut copper, nickel and other soft tubing, from 1/8" to 5/8" OD. Not recommended for stainless steel.

Description	Item No.
Imp Tubing Cutter	AUC436001
Spare Cutting Wheels, 2/pk	AUC436002



AUC460008

Terry Tool Tubing Cutter

This is a uniquely-designed precision tubing cutter that cuts any 1/16" OD metal tubing. Its compact design allows use in awkward, hard-to-reach places without removing tubing from the HPLC.

Description	Item No.
Terry Tool Tubing Cutter	AUC460008
Spare Cutting Wheel	AUC460009



AUC436003

Heavy Duty Tubing Cutter

This cuts stainless steel, copper, nickel or aluminum tubing from 1/8" to 1 1/8" OD. Comes with both standard and heavy-duty cutting wheel.

Description	Item No.
Heavy Duty Tubing Cutter	AUC436003
Cutting Wheels, Heavy Duty, 2/pk	AUC436004

Inner Reamer

These deburr your tubing for cleaner flow and easier packing. The knurled metal handle fits comfortably in your hand. The tip of the reamer is made from high speed steel, so it can handle all types of tubing including stainless steel. The small reamer is for 1/32" to 1/16" tubing, while the large is for 1/8" to 3/8" tubing.

Description	Item No.
Small Inner Reamer, 1/32" - 1/16"	AUC205261
Large Inner Reamer, 1/8" - 3/8"	AUC205260



AUC205261

Outer Reamer

These deburr the outer edge of your tubing, for easy insertion into fittings. The reamer tip is made from hardened steel and is mounted in an anodized aluminum handle for a sure grip.

Description	Item No.
Outer Reamer for 1/16" tubing	AUC205271
Outer Reamer for 1/8" to 1/4" tubing	AUC205272



AUC205260

Tubing Bender

This can be used with copper, aluminum, brass, steel and other metal tubing. The open side design slips over the tube at any point and the wide hook grips the tubing securely. The tubing bender makes smooth short-radius bends up to 180°. It is calibrated to show the angle of bend.

Description	Item No.
1/8" Tubing Bender	AUC436021
1/4" Tubing Bender	AUC436020



AUC436020