

Bulk Gas Purifiers

Solutions that meet your needs
Service that exceeds your expectations



Bulk Purifiers

Bulk purifiers typically offer a large flow rate serving a complete facility through high purity, permanently installed plumbing to each point-of-use. This brochure outlines the features/benefits/performance of ARM's Bulk purifiers.

ARM Inc. purifiers are categorized into 3 groups. The primary distinction is based on flow rate of the gas being purified. The following is offered as a general rule:

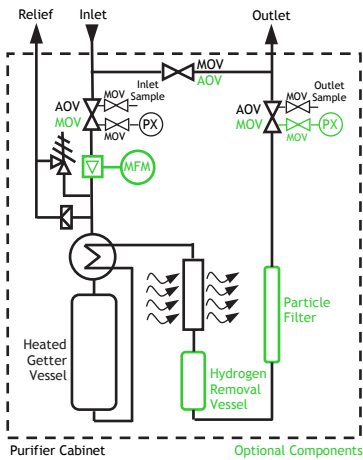
Category	Flow Rate
Point-of-Use	0.1-100 slpm
Micro-Bulk	100-1200 slpm
Bulk	60->5000 nm³/hr

Point-of-Use and Micro-Bulk Purifiers are described in their own brochures.

We understand spare/replacement part inventory can be costly, to go a step further towards lowering total cost of ownership, we can provide any of our bulk purifiers with specific brands of hardware that are compatible with other assets you have.

Advantage Series

The Advantage Series is a modular design, configurable to meet your specific requirements. Three basic technologies used are described below, which is best is based on the gas being purified and impurities needing to be removed.



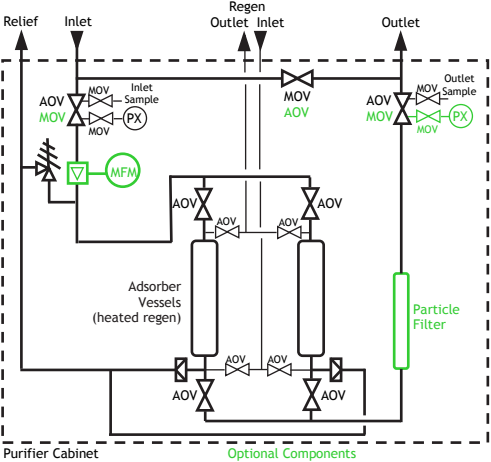
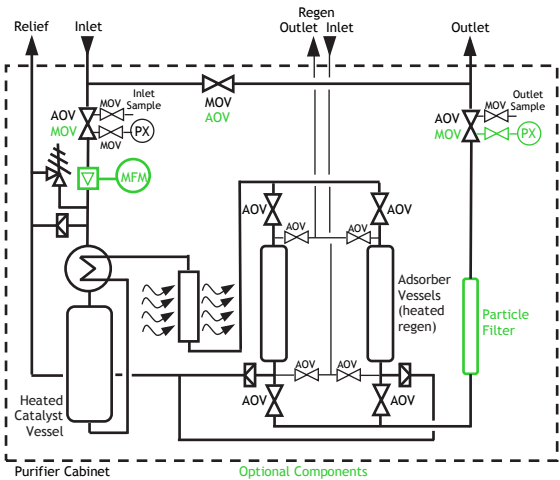
Getter purifiers use getter material, typically at elevated temperatures, to remove impurities that react with the getter and chemically bond to it. This chemical bond, once made survives for the life of the purifier.

For overall thermal efficiency, a gas-to-gas heat exchanger is incorporated to use the cold gas entering the getter vessel to cool the gas leaving the getter vessel. For added protection of downstream components, additional air or optional water cooling of the outlet gas stream is incorporated into the design.

Gases Purified	Impurities Removed to <1.0 ppb
N ₂ , N ₂ /Noble gas mix	CH ₄ , CO, CO ₂ , H ₂ , H ₂ O, O ₂
H ₂	CO, CO ₂ , H ₂ O, N ₂ , O ₂
Hydrides	CO ₂ , H ₂ O, O ₂

Catalyst purifiers use true catalytic materials that react with hydrocarbons and other impurities converting them to gas molecules that are then removed by an downstream adsorber stage. The adsorber stage is actually a parallel dual column arrangement allowing for regeneration without interrupting purified gas flow.

Gases Purified	Impurities Removed to <1.0 ppb
O ₂ , CDA	CH ₄ , CO, CO ₂ , H ₂ , H ₂ O, THC
N ₂	CH ₄ , CO, CO ₂ , H ₂ , H ₂ O, O ₂ , THC



Adsorber-Reactive Catalyst purifiers use adsorber material, or in certain instances a reactive catalyst, to remove impurities from a wide variety of gases.

The impurities are either absorbed into the material, adsorbed to the surface of the material, or with reactive catalysts form compounds on the surface of the material. To ensure uninterrupted purified gas flow, dual columns are arranged in parallel with the PLC control system performing the automatic switching and regeneration.

Gases Purified	Impurities Removed to <1.0 ppb
Ar, He, Kr, Ne, Xe, N ₂ , H ₂	CO, CO ₂ , H ₂ , H ₂ O, NMHC, O ₂
CDA, CO ₂ , N ₂ O, O ₂	CO ₂ , H ₂ O, NMHC, Amines, NOx
Ar, CO, H ₂ , He, Kr, N ₂ , Ne, Xe	H ₂ O

Standard Features/Options

There are a variety of options with the Advantage Series bulk purifiers. The table below lists most of the common standard and optional features with the Advantage Series purifiers.

Instrumentation & Controls	Standard	Optional
Inlet pressure transducer	✓	
Outlet pressure transducer		✓
Captured overpressure exhaust	✓	
Emergency shutdown	✓	
PLC control of automatic functions	✓	
Microprocessor control of automatic functions		✓
Remote Internet access for control, upgrades		✓
Touchscreen HMI	✓	
Remote Internet access for troubleshooting		✓

Hardware	Standard	Optional
316L stainless steel tubing, fittings, components	✓	
Wetted surfaces electro-polished	✓	
Steel and aluminum enclosures, powder coated	✓	
Manually operated bypass valves		✓
Pneumatic/electric operated valves	✓	
Industry standard inlet/outlet connections	✓	
Gas-to-gas heat exchangers (as required)	✓	
Air cooled heat exchangers (as required)	✓	
Water cooled heat exchanges		✓
Flow meter/flow totalizer		✓
Overpressure relief protection	✓	
Particle filtration		✓

Specifications Common to All

The Advantage Series has been designed to be modular to meet the specific needs of the application. When quoted the exact specifications will be defined and can include:

Specification	Range	Specification	Range
Maximum allowable working pressure	150 to 250 PSI	Pressure drop	1 Bar or less
Inlet/outlet tube diameters	1/2" to 4"	Outlet purity	Down to < 1PPB
Flow rate	60 to > 5000 nm3/hr	Input power	100 to 240 VAC 50/60 Hz

Control & Instrumentation

The Advantage Series purifiers come standard with PLC controls and touchscreen HMI. For process flow and any automated routines such as regeneration, electro-pneumatic valves are controlled by the PLC. Manual valves are used for isolation of instruments such as pressure transducers and for sample or test ports as required.

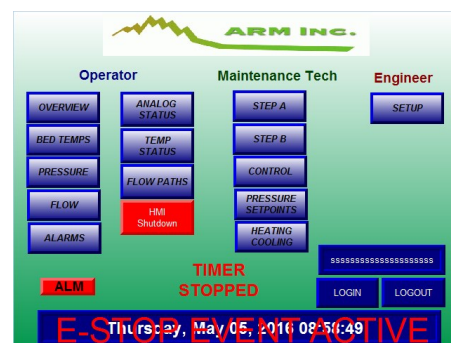
The Advantage Series indication and control software provides three separate password controlled access levels:

Operator level allows access to all indications necessary to verify proper operation.

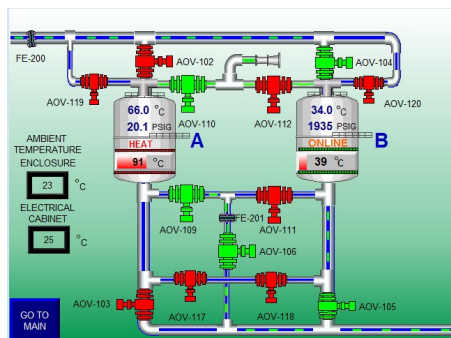
Maintenance Tech level allows access to control a number of subroutines designed for care and maintenance of the purifier.

Engineer level allows access to all operator and maintenance tech screens as well as the ability to set up all parameters, limits, alarms etc.

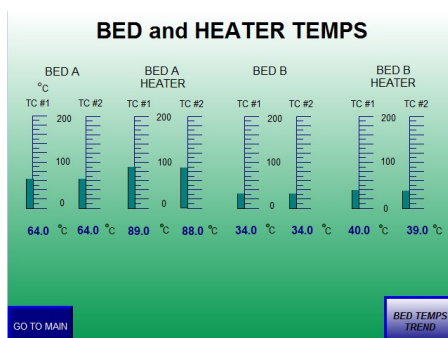
REMOTE ACCESS option allows ARM remote access to the purifier control program for both updates and factory assistance with operation or troubleshooting should that become necessary.



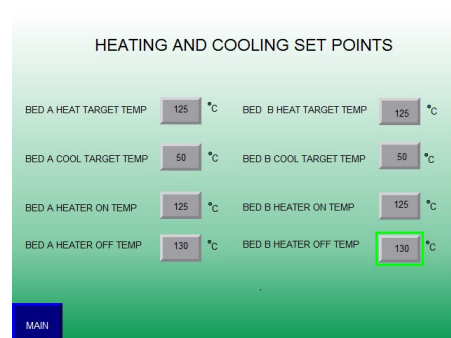
Main entry screen, with options for 3 levels of password protected operation.



Main status screen, with valve condition, pressures and temperatures displayed.

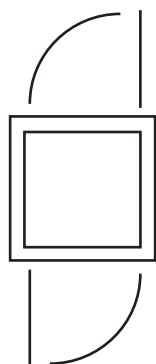


Typical indication screen, with graphic display of bed temperatures.



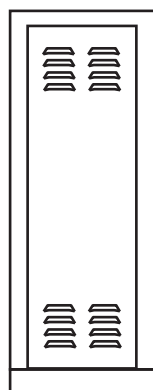
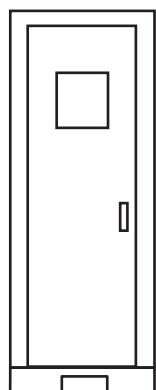
Typical set point input screen (engineer level access).

Bulk Gas Purifiers



Single Enclosure

Dimensions are:
30.0" (762mm) wide
30.0" (762mm) deep
84.0" (2,032mm) tall



Enclosures

Three common enclosure sizes are available for protected area installation. The door clearance required is 28.0" (711mm) and is typical for all doors shown.

Hinge locations are as shown unless otherwise specified. Opposite hinge locations are optional (specify when ordering).

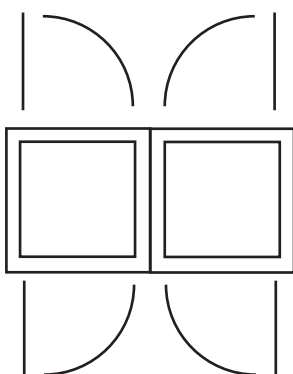
Louvered side panels are standard, and are removable for easy maintenance access. Internally mounted filters are included to help maintain internally cleanliness.

Enclosures are constructed of steel and aluminum and are powder coated standard ARM Inc. colors.

All metal enclosure components are properly grounded and access to electrical control and instrumentation is protected with EMO interlocks.

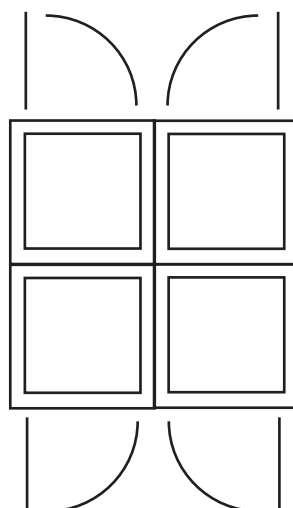
All user control and indication displays/interfaces are accessible without removing panels or opening doors.

Leveling pads are included, and the base frame can accommodate user supplied seismic tie-downs when required.



Double Enclosure

Dimensions are:
60.0" (1,524mm) wide
30.0" (762mm) deep
84.0" (2,032mm) tall



Quadruple Enclosure

Dimensions are:
60.0" (1,524mm) wide
60.0" (1,524mm) deep
84.0" (2,032mm) tall



Unprotected Environments

When the purifier will be located in an area such as a gas pad, where protection from the elements must be incorporated into the design, ARM is still your go-to source.

We can provide the same purifier technologies, with the same options as outlined in this brochure, in a suitable enclosure, regardless of the type of environment, cold, temperate, or hot.

Advantage Series, A Different Approach....

The typical purifier manufacturer will present a number of standard systems with available options and specifications for flow rate, output purity etc. via their web site or printed brochure. It is up to the customer to sift through the specs to determine which model is best suited, then call to verify that the choice is in fact the best and define the options desired and request a quote. Many times the flexibility is limited to specific models/sizes/option selections that the manufacturer's marketing group has determined are most popular.

At ARM Inc. we are the experts with our products, and we understand the customer may not be intimately familiar with the technologies and configuration flexibility that ARM Inc. offers. We understand your time is valuable, and we have proven to ourselves over the years that the shortest time between RFQ and quotation, with the least amount of customer time required, is via verbal communication. At ARM, Inc., we approach bulk purifier inquiries with a level of customer service that leads little doubt regarding performance, price and total cost of ownership.

..... from initial inquiry to commissioning

Confirm Spec This can be as simple as a call/conference call to relay the basic requirement: gas, impurities, flow, pressure, and desired features. It can be as involved as scheduling a site visit. Regardless, our objective is to review the pure gas needs and work together to develop a detailed statement of work, hardware description and performance specs.

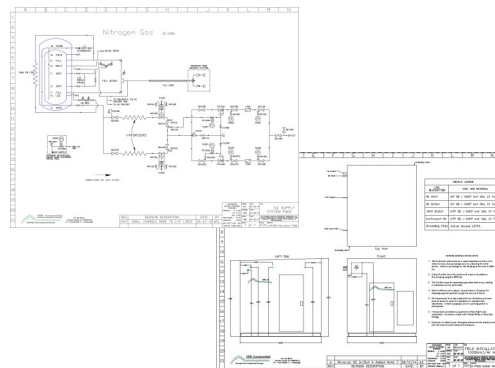
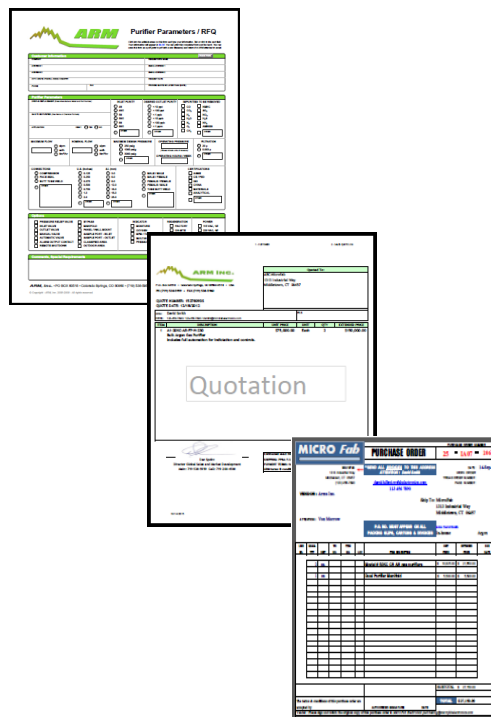
Generate Quotation A firm fixed price quote referencing a specific model number if the need matches an existing Advantage Series configuration, or referencing a statement of work and/or listing of specific configuration data is generated. The quote can also include ARM Inc. performing the installation and start up, or managing the installation and startup using local contractors.

Order Received Any order resulting from a quotation is reviewed to make sure it matches the quoted specifications and an order acknowledgement is sent. This begins the process that results in your pure gas requirements being met.

First Deliverables The first deliverables include a detailed P&ID drawing for the specific Advantage Series configuration purchased, along with a fully documented facilities drawing so you can begin to prep the location to receive the purifier.

Acceptance Testing This is done at the ARM Inc. factory. If quoted we can accommodate the customer witnessing any of the tests performed on the final assembly including Helium leak checking, pressure decay testing, particle testing and purity testing.

Delivery-Installation-Startup All ARM Inc. bulk purifiers come with a detailed user manual defining installation, startup, operation and service procedures to support customer or customer's contractor completing the installation and start up of the purifier. If purchased ARM personnel will perform installation and startup or manage the project to do so using local contractors.



....keep it simple
....keep it clean
....keep it flowing

How to begin..... Its as easy as a phone call. We will discuss your specifics, gas, flow, pressure, duty cycle, etc. Below is a document located on our website that will assist you in collecting the information we will ask about in order to define the type of technology, level of automation, and any recommended options to meet your particular gas purification requirements.

Each Advantage Series purifier built is assigned a model number identifying the basics about the purifier. As an example, working with the customer, it is determined that the system will be purifying Hydrogen gas at an 85 Nm3/hr. When quoted, the model number would be **A-4009W-85-H2**. A indicates an Advantage Series purifier, 4009W indicates the vessel size and media used, 85 indicates the rated flow, and H2 indicates Hydrogen gas is being purified.

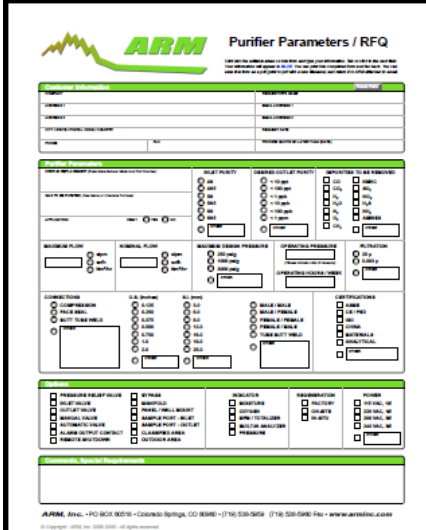
This is not the only way we identify a particular purifier, each system is serialized with documentation tying that particular unit back to engineering drawings, test records, control software, anything that may be unique to that particular purifier, which will assist us in after sales support need it be required.

Call or E-mail us today... and note that the gases and impurities, hardware descriptions, and options identified in this brochure are only the most common configurations. If you don't find your gas/impurities or other specifications it does not mean we won't have a solution. We have the knowledge, experience and willingness to pursue the technology that will work for your application.

Phone: 719-538-5959

E-mail: sales@arminc.com

For assistance with other gases, customization or other high purity requirements contact ARM, Inc., or your local rep/distributor.

The image shows a PDF form titled "ARM Purifier Parameters / RFQ". It is a detailed questionnaire for gathering technical specifications for a gas purifier. The form is divided into several sections with checkboxes and input fields. Key sections include: "Purifier Parameters" (gas type, flow rate, pressure, etc.), "Vessel & Media" (vessel size, media type, etc.), "Automation" (control system, etc.), "Options" (various add-on features), and "Contact Information". The ARM logo is at the top left of the form.

[Purifier Parameters PDF Form](http://www.arminc.com/assets/arm_psg_form07.pdf)

(http://www.arminc.com/assets/arm_psg_form07.pdf)

Also available from ARM, Inc.:

High pressure products and solutions - up to 3000 PSI....

.....gas purifiers and systems

.....pressure regulation skids

.....filter skids

