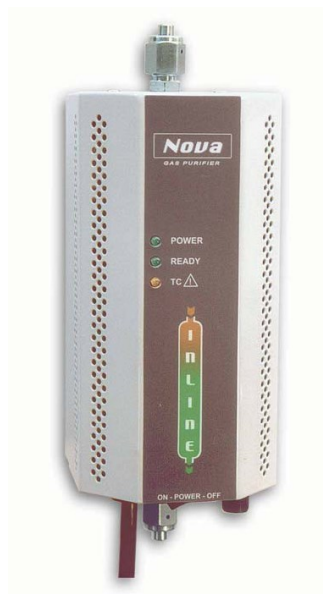


# High Purity Gas Supply System Solutions

## Point-of-Use Purifiers



### Features

- Nominal flow rates from 0.3 to 20 slpm
- Maximum flow rates from 4.5 to 300 slpm
- 316L stainless steel construction
- Particle filtration
- Simple to install

### Options

- Inlet/outlet fittings
- Inlet/outlet valves
- Sub-micron particle filtration

### Applications

- Weld gas/purge gas
- Pharmaceutical production
- Semiconductor process equipment
- Analytical equipment
- Annealing cover gas
- LED manufacturing
- Flat panel display production
- Solar & other emerging technologies



## Point-of-Use

Point-of-Use purifier is a name typically given to a purifier that offers a relatively small flow rate serving a single application/tool/use. This brochure outlines the features/benefits/performance of ARM's Point-of-Use 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:

<b>Category</b>	<b>Flow Rate</b>
<b>Point-of-Use</b>	<b>0.1-100 slpm</b>
<b>Micro-Bulk</b>	<b>100-1200 slpm</b>
<b>Bulk</b>	<b>60-&gt;5000 nm<sup>3</sup>/hr</b>

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

<b>Specification Common to All</b>	
<b>Max Operating Pressure</b>	250 PSIG (17.24 BAR)
<b>Max Operating Temperature<sup>1</sup></b>	400°C
<b>Nominal Flow Rate<sup>2</sup></b>	0.3 slpm to 20.0 slpm
<b>Maximum Flow Rate<sup>2</sup></b>	4.5 slpm to 300 slpm
<b>Pressure Drop<sup>2</sup></b>	<2 psid typical
<b>Filtration</b>	0.1 µm standard, optional 0.003 µm
<b>Wetted Surfaces</b>	Electro-polished, <10Ra, 316L stainless steel
<b>Typical Inlet Gas Purity</b>	99.999% <sup>4</sup>
<b>Outlet Purity</b>	<1 ppb
<b>Input Power</b>	100VAC, 120VAC, 230VAC, 50/60Hz, 600W (max)
<b>Inlet/Outlet Fittings</b>	VCR™ standard, optional Swagelok™ or tube stub
<b>Operating Air Supply<sup>3</sup></b>	60-90 psig CDA

1. Applicable to heated vessels in Nova and Pro-Panel Series only
2. Dependent on vessel size.
3. Only applicable with air operated valve option.
4. 50 ppm maximum

## Purification Media Options

Various fill materials are offered/recommended based on the gas being purified and the impurities to be removed. Options range from heated getters, to catalyst for reactive gases, to absorbers/adsorbers for moisture and hydrocarbon removal. See chart on page 5 for media designations for specific gases and impurities removed.

## Options

Six different vessel sizes are available to accommodate various flow rates. Inlet/outlet fitting, filtration, adding valves, and adding a hydrogen removal stage in some configurations are all available. Specifying power supply voltage and in some cases whether valves are manual or electro-pneumatic are also options.

## Other Purifiers

ARM Inc. does offer replacement of existing purifiers not originally manufactured by ARM Inc. With information on the purifier to be replaced, we will quote a drop in replacement solution.

## Purity Performance

ARM's point-of-use Vessels, Nova Series and Pro-Panel Series purifiers are designed for high purity/ultra high purity applications that require impurity levels in process gases to be 1ppb or less. Recommended flow rates are based on a targeted 1 year service life between regeneration or replacement. Actual useful lifetime is influenced by the actual flow rate of the gas being purified, and the inlet impurity concentrations.

## Output Purity Testing and Certification

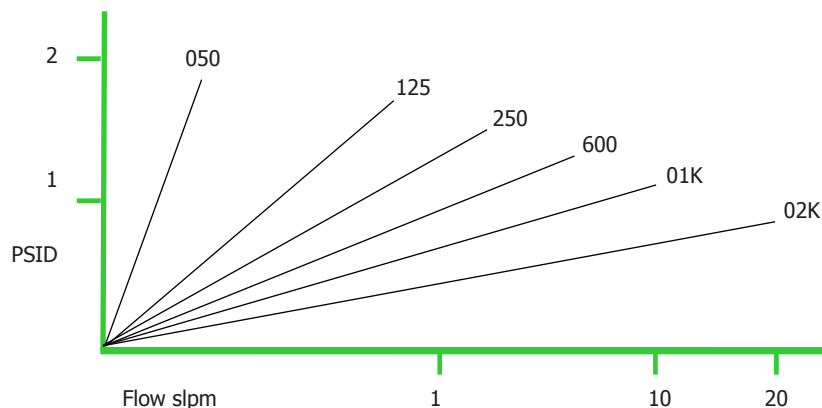
When required or desired ARM Inc. can include in the quote APIMS purity testing to verify output purity. When purity testing is purchased with a purifier, a certification of purity, with the test data in a report format, is included with the purifier.

## Available Upon Request

ARM maintains an active development program, we welcome a challenge and will respond to requests for:

- high pressure purifiers
- less stringent purity requirements (ppm vs. ppb)
- customized solutions for atypical requirements

<b>Features</b>	<b>Vessel Only</b>	<b>Nova Series</b>	<b>Pro-Panel Series</b>
<b>Heated operation</b>	No	Yes	Yes
<b>Optional inlet/outlet/bypass valves</b>	Yes	Yes	Yes
<b>Optional pneumatic inlet/outlet valves</b>	N/A	Yes	Yes
<b>Power status LED</b>	N/A	Yes	Yes
<b>Ready (for operation) LED</b>	N/A	Yes	Yes
<b>Thermocouple fault LED</b>	N/A	Yes	Yes
<b>Process LED</b>	N/A	No	Yes
<b>Alarm LED</b>	N/A	No	Yes
<b>Valves open LED</b>	No	No	Yes



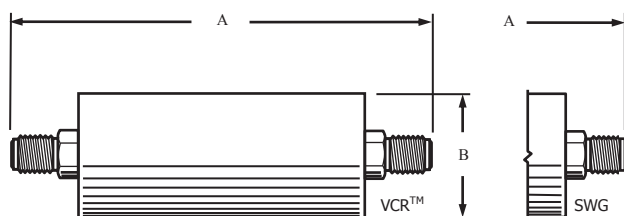
Typical pressure drop at 100 psi and nominal flows

## Vessel Only

ARM, Inc. purifiers are manufactured to exacting standards including use of low sulfur 316L stainless steel with internal surfaces electro-polished to meet a <10Ra finish. Semi-automated welding of the components is conducted in class 100 clean zones using purified Argon cover gas. All finished assemblies are Helium leak checked to <2x10<sup>-9</sup> atm cc/sec. The purifiers are shipped cleaned, purged, and capped for immediate use.

ARM's Point-of-Use vessel only purifiers designed to operate without requiring heat to remove impurities. Factory regeneration is available for applicable models. The 6 different model sizes indicated are standard, other dimensions are available for drop in replacement of existing purifiers. They are also available with the Nova In-Line Series purifiers and Pro-Panel Series purifiers. **Note:** the 02K vessel is not available in the Nova Series.

Dimensions & Flow Rates



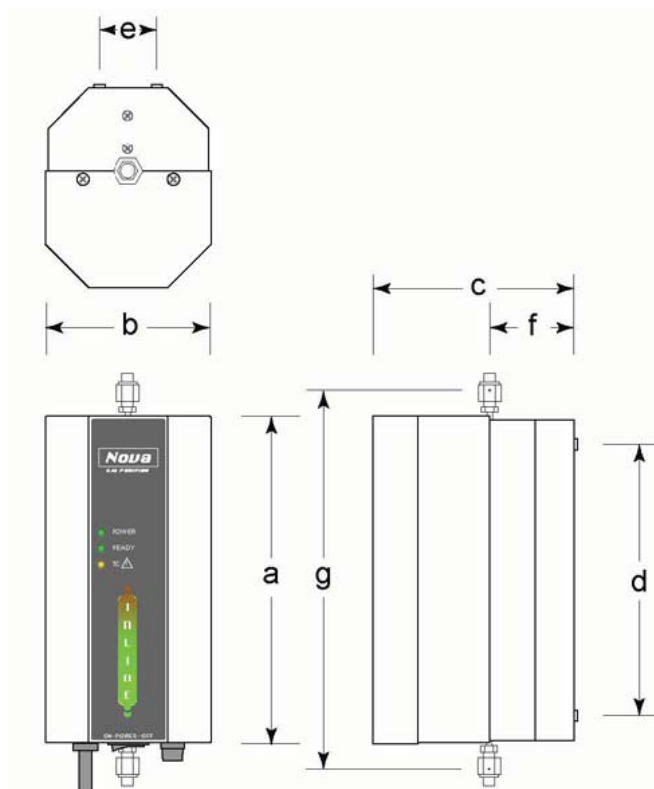
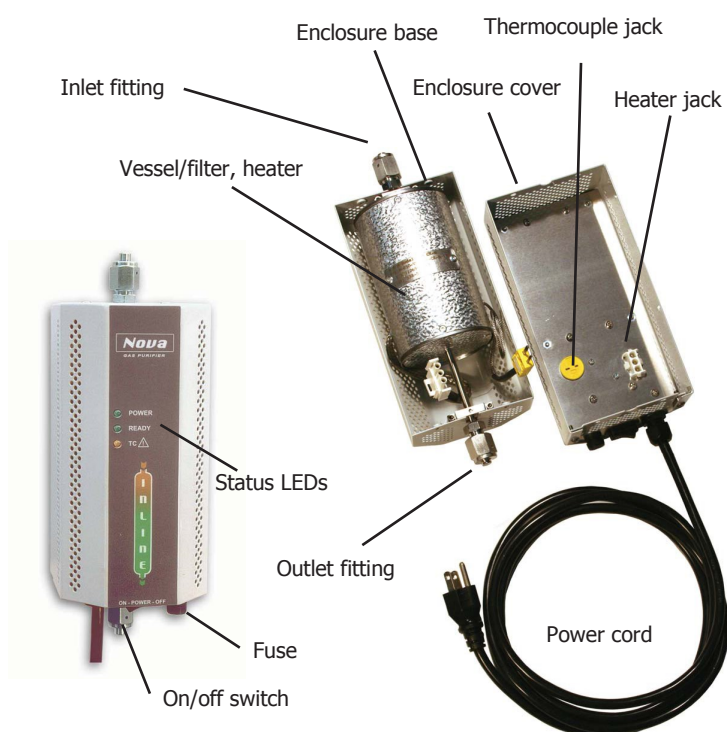
Model	Units	Dimensions			Flow slpm		
		A		B	Nominal	Max FP	Max CR
050	mm	84.0	72.1	25.4	0.3	1.5	4.5
	inch	3.30	2.84	1.00			
125	mm	84.0	72.1	38.0	1.0	5.0	15.0
	inch	3.30	2.84	1.50			
250	mm	122.0	110.2	38.0	2	10	30
	inch	4.80	4.34	1.50			
600	mm	160.0	148.3	51.0	6	30	90
	inch	6.30	5.84	2.00			
01K	mm	224.0	211.8	51.0	10	50	150
	inch	8.80	8.34	2.00			
02K	mm	317.0	305.8	64.0	20	100	300
	inch	12.50	12.04	2.50			

- Nominal flow rates are based on 1 yr service life
- Max flow rates are at 150 psig gas pressure
- Weights range from 1 to 10 lbs based on size and fill material

## Nova Series In-Line Purifiers

The Nova Series purifiers incorporate a heater, temperature indication and control. They are typically used when the process gas and impurities to be removed indicate a heated operation is required. Manual inlet/outlet and bypass valves are typical options specified for ease of vessel replacement/regeneration. See chart above for flow rates.

System Components



Model	50/125/250		600/01K	
Dim	mm	Inch	mm	Inch
a	207.0	8.15	362.0	14.25
b	105.4	4.15	156.2	6.15
c	127.0	5.00	196.9	7.75
d	177.8	7.00	276.9	10.90
e	38.1	1.50	50.4	2.00
f	50.8	2.00	86.4	3.40
g	254.0	10.00	412.8	16.25

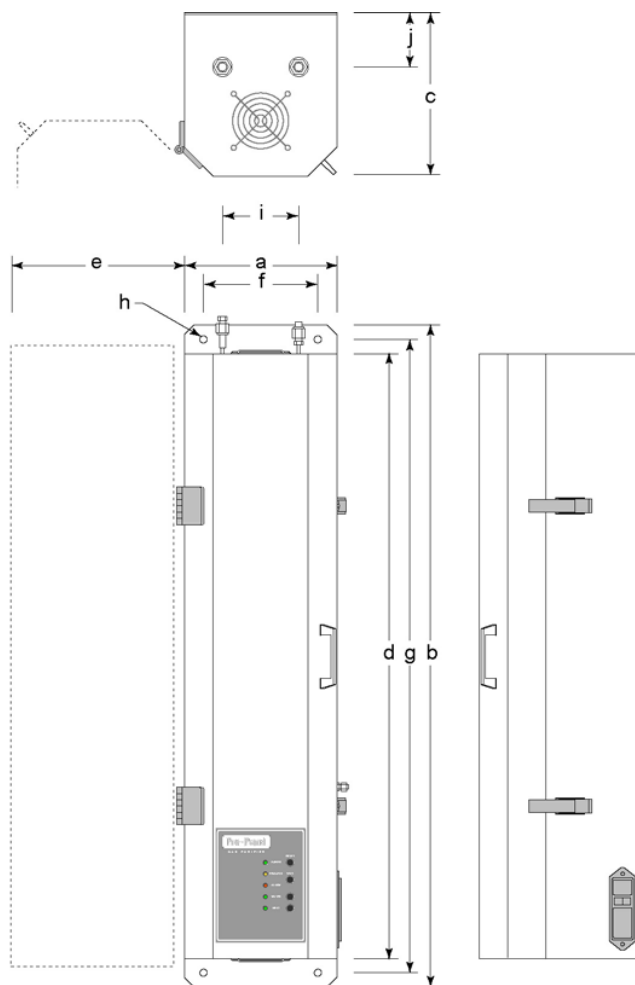
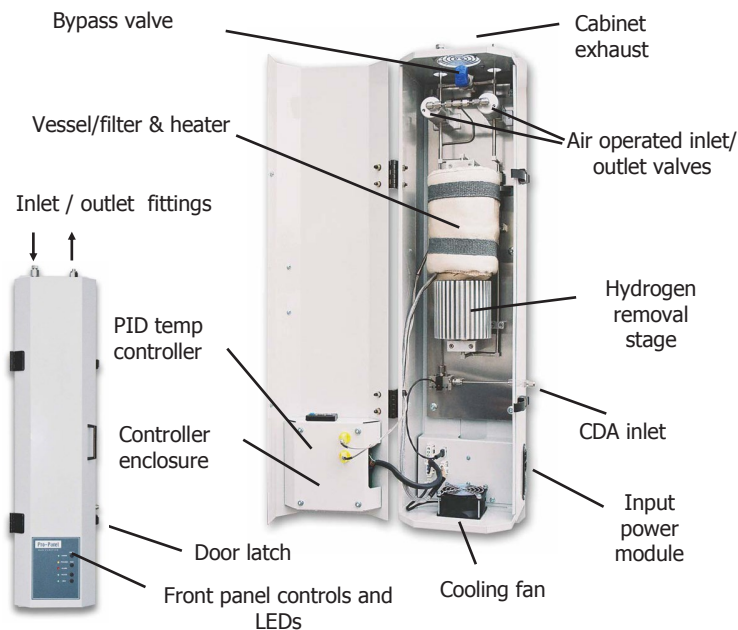
- Weights range from 3 to 15 lbs based on size, fill material, and options selected

## Pro-Panel Series Purifiers

## Point-of-Use Gas Purifiers

The Pro-Panel Series purifiers is similar to the Nova Series purifiers, but offers more automation and integration. Automated heater control, pneumatic inlet/outlet valves and customer contacts for interfacing with a host for alarm/indication are standard with the Pro-Panel Series. Pneumatic bypass valve operation is an option.

### System Components



Dimensions	Dim	mm	inch
Overall	a	203.3	8.00
	b	882.7	34.75
	c	215.9	8.50
Door Clearance	d	806.5	31.75
	e	228.6	9.00
Mounting	f	152.4	6.00
	g	844.6	33.25
	h	9.0 dia	0.38 dia
Connections	i	101.6	4.00
	j	69.9	2.75

● Weights range from 37 to 52 lbs based on size, fill material, and options selected

### Specifying a Point-of-Use purifier.

Purifiers are specified and ordered based on a constructed model number as described below.

Notes:

- Not all options listed are available with all products.
- Vessels only do not require electrical power, but options include manual valves and panel mounting.
- Nova In-Line Series purifiers are used when heated operation is required and self contained control and personnel safety are concerns.
- Pro-Panel Series purifiers are also used when heated operation is required, automated control is required and/or when interfacing with a host is desired for small area control.



# Point-of-Use Gas Purifiers

## Product Series

The product series defines one of the 3 options available.

- (blank)** Point-of-Use, vessel only (options available)
- N** Nova Series
- P** Pro Panel Series

## Vessel Size & Class

The vessel size and class are required. The vessel size is typically selected based on the anticipated flow rate of the gas being purified. In some cases it is desirable to oversize the vessel to enhance purity or lifetime performance. The chart below lists nominal flow rates at 150 psi line pressures to achieve specified impurity removal to <1ppb for a nominal 1 year service life. Max flow rates listed are based on filtration option specified, FP=0.003µm, CR=0.1µm.

Vessel Size	Nominal flow for 1 year life	Maximum flow FP	Maximum flow CR	Available with Series
<b>050</b>	0.3 slpm	1.5 slpm	4.5 slpm	(blank), N, P
<b>125</b>	1.0 slpm	5.0 slpm	15.0 slpm	(blank), N, P
<b>250</b>	2.0 slpm	10.0 slpm	30.0 slpm	(blank), N, P
<b>600</b>	6.0 slpm	30.0 slpm	90.0 slpm	(blank), N, P
<b>01K</b>	10.0 slpm	50.0 slpm	150.0 slpm	(blank), N, P
<b>02K</b>	20.0 slpm	100.0 slpm	300.0 slpm	(blank), P

Vessel size & class descriptor ends with a designation for the fill material required to remove specific impurities from specific gas streams. See the chart below to complete the vessel size & class descriptor for common gases and impurities. This is not a complete list of every possible impurity that can be removed from every possible gas. If the gas to be purified, or impurities are not listed, contact ARM, Inc. for assistance.

Class	Available with Product Series	Gases Purified	Impurities removed	Removal Efficiency	Heated Operation	Regen Capable
<b>C</b>	(blank)	Ar, He, Kr, Ne, Xe, N <sub>2</sub> , & H <sub>2</sub>	CO, CO <sub>2</sub> , H <sub>2</sub> , H <sub>2</sub> O, NMHC, O <sub>2</sub>	<1 ppb	No	Yes
<b>CA</b>	(blank)	Ar, He, Kr, Ne, Xe, N <sub>2</sub> , & H <sub>2</sub>	CO, CO <sub>2</sub> , H <sub>2</sub> , H <sub>2</sub> O, NMHC, O <sub>2</sub>	<1 ppb	No	Yes
<b>F</b>	(blank)	C <sub>2</sub> F <sub>6</sub> , C <sub>3</sub> F <sub>8</sub> , C <sub>4</sub> F <sub>8</sub> , CClF <sub>3</sub> , CCl <sub>2</sub> F <sub>2</sub> , CCl <sub>4</sub> , CF <sub>4</sub> , CHClF <sub>2</sub> , CHF <sub>3</sub> , & CH <sub>3</sub> F	CO, CO <sub>2</sub> , H <sub>2</sub> , H <sub>2</sub> O, NMHC, O <sub>2</sub>	<1 ppb	No	No
<b>H</b>	N, P	H <sub>2</sub>	CO, CO <sub>2</sub> , H <sub>2</sub> O, N <sub>2</sub> , O <sub>2</sub>	<1 ppb	Yes	No
<b>N</b>	N, P	N <sub>2</sub> , N <sub>2</sub> /Noble gas mix	CO, CO <sub>2</sub> , H <sub>2</sub> , H <sub>2</sub> O, O <sub>2</sub> , THC	<1 ppb	Yes	N/A
<b>O</b>	N, P	CDA & O <sub>2</sub>	CO, H <sub>2</sub> , THC	<1 ppb	Yes	N/A
<b>OX</b>	(blank), N, P	CDA & O <sub>2</sub>	CO <sub>2</sub> , H <sub>2</sub> O, NMHC, Amines, NO <sub>x</sub>	<1 ppb	No	Yes
<b>R</b>	N, P	Ar, He, Kr, Ne, & Xe	CO, CO <sub>2</sub> , H <sub>2</sub> , H <sub>2</sub> O, N <sub>2</sub> , O <sub>2</sub> , THC	<1 ppb	Yes	No
<b>T</b>	(blank)	BCl <sub>3</sub> , BF <sub>3</sub> , Cl <sub>2</sub> , ClF <sub>3</sub> , F <sub>2</sub> , HBr, HCl, HF, NF <sub>3</sub> , SF <sub>4</sub> , WF <sub>6</sub>	H <sub>2</sub> O	<1 ppb	No	No
<b>W</b>	(blank), N, P	Ar, He, Kr, Ne, Xe, H <sub>2</sub> , & N <sub>2</sub>	H <sub>2</sub> O	<1 ppb	No	Yes
<b>Y</b>	(blank)	AsH <sub>3</sub> , B <sub>2</sub> H <sub>6</sub> , CH <sub>4</sub> , D.C.S.(SiH <sub>2</sub> Cl <sub>2</sub> ), Ge <sub>2</sub> H <sub>6</sub> , GeH <sub>4</sub> , H <sub>2</sub> Se, NH <sub>3</sub> , PH <sub>3</sub> , SF <sub>6</sub> , SiH <sub>2</sub> , SiH <sub>4</sub> , Si <sub>2</sub> H <sub>6</sub> , DMHZ, & Hydride/Carrier Gas mix	CO <sub>2</sub> , H <sub>2</sub> O, O <sub>2</sub>	<1 ppb	No	Yes



....keep it simple

....keep it clean

....keep it flowing

## Inlet/Outlet Connections

Options are VCR™ face seal fittings (**V**), Swagelok™ fittings (**S**), and tube stubs (**T**) if the vessel will be welded into place. Two sizes of each are offered, 1/4" (**04**), 1/2" (**08**), not all vessels support all sizes.

Example: 1/4" VCR™ fittings would be **V04**, 1/2" tube stub would be **T08**.

Vessel Size	Types	Sizes
<b>50</b>	V, S, T	04
<b>125</b>	V, S, T	04
<b>250</b>	V, S, T	04
<b>600</b>	V, S, T	04, 08
<b>01K</b>	V, S, T	04, 08
<b>02K</b>	V, S, T	04, 08

## Gas

Gas abbreviation ex: **Ar**– Argon, **N2**-Nitrogen. Options are from those gases listed in the Vessel Class chart on page 5.

## Filtration

All purifiers include an integral filter. Two standard options are available **CR**-0.1 micron and a **FP**-0.003 micron, these filter particles down to the size specified to less than 1 particle per cubic foot of gas.

**Note:** The options listed below will fill the remaining blocks in the model number. If an option is not desired or applicable, simply skip it and use the next option chosen in sequence. Not all options are available with all Product Series.

## Hydrogen Removal

If a Hydrogen removal stage is required/desired, use designator **H**.

## Input Power

With the Nova and Pro Panel Series purifiers the controllers require power for operation. If power is required, the following voltages are available. Selection is based on available power at the installation and in some instances the country where the purifier will be used. In all cases the frequency is 50/60KHz. Designators to use are **100**-100VAC, **120**-120VAC, **230**-230VAC.

## Isolation Valves

If adding isolation valves to the purifiers is desired the following designators are used. **I**-Inlet only, **O**-Outlet only, **IO** both inlet and outlet valves. Depending on which type of purifier is selected these valves will be manually operated or automatically operated.

## Valve Operation

If valves are selected or included, use designators **M**-manual operation, **A**-air operation.

## Panel Mounting

Panel mounting option is **not applicable** for the Pro Panel Series purifiers. For the Point of use purifiers, it is sometimes convenient to mount the vessel and valves if selected onto an aluminum panel with mounting holes to facilitate mounting the purifier to a wall or other structure. If panel mounting option is required/desired, the designator is **P**-Panel mount.

(VCR and Swagelok are trademarks of the Swagelok Company)

**Contact ARM, Inc., or your local rep/distributor for assistance, or for gases and options not listed.**

