

Section 1 - Low Pressure Regulators



Air-Pak® Filter
FR95

CONTROL A PRESSURE – PASS A FLOW

That's what we do. That's what all regulators do in the most simplistic of definitions. Hopefully, this training guide will attempt to simplify the Conoflow catalog into easy to understand terms and selections as we work our way through the various choices and selection process.

HIGH vs. LOW

Pressure, that is. Conoflow produces both High and Low Pressure regulators. We are one of the few manufactures who do. Conoflow defines low pressure as input pressures of 300 psi and lower and high pressure as above 300. That 300 psi border separates Conoflow's two regulator types. Although all regulators Control a Pressure – Pass a Flow and work relatively the same, we will separate Conoflow's High and Low pressure regulators into two sections.

Remember, High or Low? This is one of the first application questions to ask a customer. For additional questions, see page x.

Conoflow manufactures many types of Low Pressure Regulators. Some are for general service and some are for much more specific applications. In an attempt to group these regulators into a "basket" of products with similar characteristics, we have broken down our offering in the following groups:

- Air Pack Filter Regulators
- Pressure Reducing Regulators
- Specialty Reducing Regulators



Service and Pressure
Reducing GH20, GH40,
GH24, & GH25

In many instances, the application will lead you to the group of Regulators that fit best. Thus, your second Regulator question to ask would be "What is the Regulator being used for or what is its application?". If the answer leads you to a general service air or gas regulator supplying filtered media to some type of equipment, Group #1 would be your first choice.

Note: Please make yourself familiar with the "Terminology" section in front of the catalog and/or product whitepapers available on our web site

Air Pack Filter Regulators

Model #	FR95	GFH45	GFH75	GFH76
Max. Supply Range	250 psi	300 psi	300 psi	300 psi
Flow	25 scfm	20 scfm	20 scfm	20 scfm
Material	Aluminum	Brass	316SS	316SS/NACE
Filter Micron	35	35	35	35
Application	OEM	Chemical	Severe Service	Offshore

All of these regulators have 1/4" connections; several control ranges and various options. See Control Engineering Data in our catalog for complete listing.

One of the most misunderstood and confusing aspects of application terminology concerns Conoflow's 3 seat styles. Once you understand the differences and where they are used, everything becomes clearer, including the application.

The 3 seat (diaphragm) styles we use at Conoflow are:

- Relief and Constant Bleed
- Relief and No Bleed
- No Relief and No Bleed

The definitions for these are again in the Terminology section of the Catalog but for the purpose of this training, let's make it simple.

Relief: When downstream backpressure builds up on the output side, the excess is then vented to atmosphere (out of the regulator).

Bleed: A small orifice (hole) in the Diaphragm that allows a constant exhaust of the flow. This keeps the diaphragm/nozzle in a dynamic (moving) state which increases the sensitivity. It also is vented to atmosphere.

No Relief/No Bleed: Nothing is ever vented to the atmosphere. These are constant flow applications.

Our GH10 series is the only series of low pressure regulators which we offer with the Bleed feature. These are our most sensitive and accurate regulators because of the constant motion of the diaphragm assembly. You will see them in our next group of regulators.

Model #	GH10	GH15	GH20/40	GH24/26
Max. Supply Range	300 psi	300 psi	200/300 psi	250 psi
Flow	14 scfm	20 scfm	20 scfm	45/55 scfm
Material	Aluminum, brass, stainless	Aluminum with brass nozzle	Brass/alum. brass, stainless	Aluminum 3/8" / 1/2" ports
Sensitivity	.20" H ₂ O	.05 psi	.05 psi	.1 psi
With Bleed	Yes	No	No	No
Application	Precision/labs fine tune	4 ports	Actuator, valve control	Water treatment, Liquids

All of these regulators have far too many options to list them all in this chart. Again, please review the CED information in the catalog to help you "fine tune" your selection. For example, the GH10, our precision regulator with the Bleed option is available in 8 range selections, 14 diaphragms, 6 seat selections and 5 adjustment types.

With all of these options available, we need to narrow the list by asking two more Regulator Selection Questions:

1. What is the media we are going to regulate?
2. What are the preferred materials of construction?

The answers to these two questions will tell us, (or encourage the user to tell you) what he wants the regulator to be constructed of, inside and out.

Specialty Regulators

This brings us to the last group of Low Pressure regulators in this guide which we call Specialty Regulators. For the most part, these regulators have a specific purpose or application. Sometimes they can be used in creative ways that we usually do not think about. That's why we continue to ask questions. Here are a few more that complete the list.

1. What is your outlet pressure control range?
2. Do you have any particular flow requirements?
3. What is your minimum and maximum operating temperature?

Model #	GH21/41 Differential	GH/20/28 Vacuum	GH30 Back Pressure
Material	Brass, aluminum, stainless	Brass, aluminum, stainless	Brass, aluminum, stainless
Flow	Call Factory	1.5 scfm	up to 28 scfm
Sensitivity	.2" H ₂ O	.2" H ₂ O	.05 psi
Application	Liquid level purge	Labs/robotics Space shuttle	Relief valve

As is the case with our other regulator groups, there are many options available for each regulator, such as diaphragm and seat materials selections. They also come with standard materials of construction in case the user does not know their specific requirements. There are several other "specialty regulators" in the catalog so please become familiar with those as well.

These three groups of regulators will represent over 90% or more of your low pressure sales. So remember, ask the questions and let the answers direct you to the best solution for the application.

Oh Yea, here is the best question to ask . . . Do you guys use Regulators?

Regulator Selection Questions

1. Do you currently use regulators? If so, who?
2. What is your application? (constant flow, dead-ended, set and forget, continually adjusting, liquid level)
3. What is the maximum supply pressure?
4. What is your outlet pressure setting or control range?
5. What are you going to regulate? (air, water, gas)
6. What are your operating temperature limits?
7. Do you have any special flow requirements?
8. What are your preferred materials of construction?

Section 2 - High Pressure Regulators

A great deal of what we have discussed in Section 1: Low Pressure Regulators will apply to High Pressure Regulators as well. The Regulator Selection Questions that we used to identify the user's applications and material selections will remain the same. After all, we are still just Controlling a Pressure and Passing a Flow. The only difference is that the input pressure/control ranges are higher and the materials used in manufacturing are more robust.

Although we noted earlier, in Section 1, to make you familiar with the "Terminology" section in the front of the catalog, let's take a look at a specific phenomenon in pressure regulators called Supply Pressure Effect. This effect is prevalent in both high and low pressure regulators but is more closely monitored or measured in high pressure applications due to the potential of increased cost from poorly performing regulators.

SUPPLY PRESSURE EFFECT is the increase in set pressure (outlet control pressure) as the supply pressure decreases. This supply pressure is generally being furnished by bottled gas. As the supply pressure decreases, the main force acting or "pushing" against the range control spring decreases. This allows the range spring to extend or "push" down, further opening the valve. The result is an increase in the downstream pressure without anyone changing the control setting. Obviously, this is not a good situation in that it changes the downstream dynamics and is costly. At Conoflow, we go to great lengths to minimize Supply Pressure Effect and are proud to publish our specifications for each High Pressure Regulator.

One of the most cost effective and efficient ways to reduce supply pressure effect is with a Conoflow HP700 two stage regulator. This is actually two regulators (HP 500s) assembled as one unit. As the first stage or upstream regulator takes out the larger swings of decreasing supply pressure, it feeds a more constant pressure to the downstream or second stage regulator thus creating a very low Supply Pressure Effect. In this case the HP700, has a .03 psig increase for each 100 psig supply decrease.

The HP 700 is a member of our first group of High Pressure Regulators that have very similar characteristics. The one feature that most closely identifies this group of regulators is they have Stainless Steel Diaphragms as their pressure sensors. Another feature of this group that separates them from the piston sensing regulators is they can all be used in High Purity applications with 15 Ra microninch wetted surfaces available upon request.

Diaphragm Sensing High Purity Regulator

Model #	HP200	HP500	HP600	HP700
Type	Back Pressure	Reducing	Tied Diaphragm	2-Stage
Max. Supply Range	500 psi	6000 psi	3000 psi	6000 psi
Material	Brass 316SS	Brass 316SS Monel Hastelloy	316SS	Brass 316SS
NACE	Yes	Yes	No	Yes
Panel Mount	Yes	Yes	No	Yes
Gauge Ports	Optional	Optional	Yes	Yes
Supply Pressure Effect	N/A	1.0 psig	0.8 psig	0.03 psig
Application	Compressors, Sampling systems, Pump Pressures	Offshore panels, Gas chromatography, Specialty gases, Research labs, Medical	Semi conductor, Specialty Gases, Labs	Gas chromatography, Cylinder gases, Calibration systems

As is the case with the Section 1 or Low Pressure Regulators, please refer to the catalog and the CED information for all of the available options.

REMINDER: Do not forget the 8 Regulator Selection Questions which were discussed in Section 1. They are just as important for “High Pressure” selection as they are for Low Pressure selection.

The second group of regulators we will look at in this High Pressure section again has one feature in common as did the regulators in Group 1. They all have stainless steel pistons as their pressure sensors. In general, regulators which use pistons as their sensors are for much higher pressure applications than those that use diaphragms.

Piston Sensor High Pressure Regulators

Of special note in this group, the HP 300 Regulator has been approved by the **Railroad Commission of Texas** to be in compliance with the Regulators for Compressed Natural Gas.

Model #	HP300	HP400	HP80
Type	Reducing, relieving, and non-relieving	Reducing, Non-relieving	Backpressure
Max. Supply Range	10,000 psig	3500 psig	15,000 psig
Material	Brass 316SS NACE	Brass	Brass 316SS NACE
Panel Mount	Yes	Yes	Yes
Leakage	Bubble tight	Bubble tight	Bubble tight
Gauge Ports	Yes	Yes	No
Ports	1/4" NPT	1/4" NPT	1/4" NPT Options: SAE MS 33649
Application	Charging systems, Cylinder gases, Process sampling, Corrosive gases	Calibration systems, Economical pressure reduction	Controlling pump pressure, Hydraulic systems, Fluid sampling, Relief valve

High Pressure Specialty Regulators

The last group of High Pressure Regulators that we will “batch” together really has nothing to do with each other. They are Specialty Regulators each with a specific function or application. As in the case of the Conoflow HP555 Electric Vaporizing Regulator and the HP550 Steam Vaporizing Regulator, Conoflow has available power point training modules on our website, www.conoflow.com or contact your Regional Sales Manager for specific information on these products.

Model #	HP100	HP610	HP555	HP550
Type	Reducing	High Flow CV = .95	Electric Vaporizing	Steam Vaporizing
Max. Supply Range	6000 psi	250 psig	1500 psig	3600 psig
Material	Brass Aluminum 316SS	Brass 316SS 20 Ra finish	316SS	316SS
Application	Dead end systems, Sampling systems, Research labs, Calibration systems	Semi-conductor, Purge systems, High flow rates	Sample systems, Gas chromatographs, Vapor pressure control	Sample systems. Gas chromatographs, Vapor pressure control

Remember: High vs. Low/Control A Pressure - Pass A Flow