

DESCRIPTION

The Type-650 positive bias relay is a signal operated regulator that provides an output pressure that is the sum of the input signal pressure plus a preset bias. The unit allows flow capacities up to 50 SCFM with minimal pressure drop. An aspirator tube at the output maintains the set pressure under varying flow conditions by causing the main supply valve to open and close proportionally to the flow demand. There is a choice of four adjustment ranges for the positive bias settings. This unit is most often used for conversion of a low flow control signal to the higher flow requirements of an operating system.

FEATURES

- **HIGH FLOW CAPACITY** - Allows flows up to 50 SCFM.
- **FOUR BIAS RANGES** - From 0-15 psi to 2-150 psi.
- **HIGH RELIEF CAPACITY** - Large relief valve provides 15 SCFM relief capacity.
- **BALANCED SUPPLY VALVE** - Rolling diaphragm design makes unit insensitive to supply pressure variation.
- **ACCURATE PRESSURE CONVERSION** - High sensitivity achieves accurate conversion of signal to output with no lag.

APPLICATIONS

The Type-650 is used extensively for increased flow capacity or remote pressure control applications. This includes web tensioning, roll loading, control valve actuators, I/P volume boosting, cylinder actuation, clutch and brake control, and gas flow control.

MATERIALS

Body: Diecast aluminum. Internal components: Stainless steel, brass, plated steel, acetal. Diaphragm: Nitrile elastomer and polyester fabric. Knob: ABS plastic.



TYPE-650 POSITIVE
BIAS RELAY

TYPE 650 POSITIVE BIAS RELAY

PRINCIPLE OF OPERATION

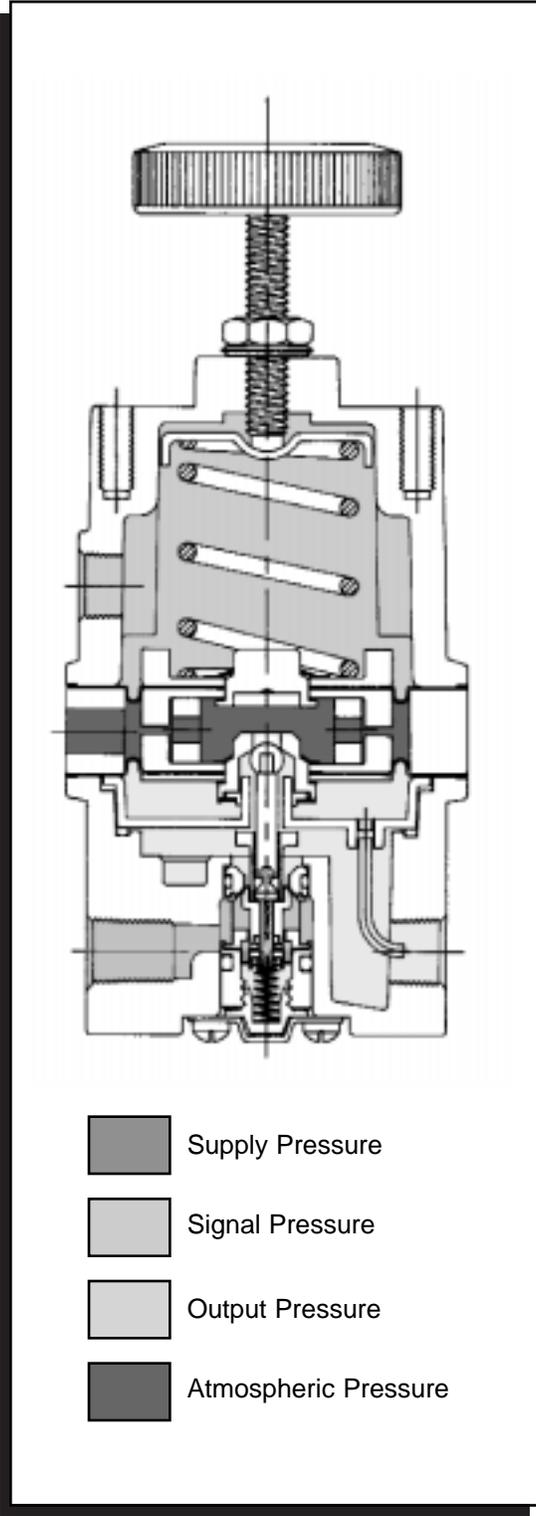
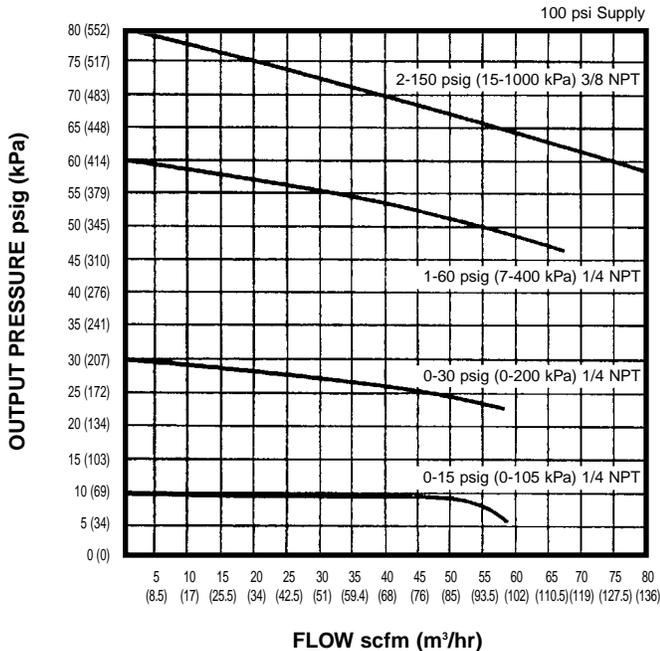
A pressure introduced through the signal port in combination with the bias spring creates a downward force on the upper diaphragm area. This force is balanced by the output pressure acting against the lower control diaphragm area.

If signal pressure and/or bias spring force is increased above the output pressure then there is a net downward force on the diaphragm assembly causing the supply valve to open. Output pressure increases until equilibrium is achieved. When signal pressure and/or bias spring force is decreased below the output pressure, the diaphragm assembly rises, allowing output air to escape through the exhaust vent until equilibrium is achieved.

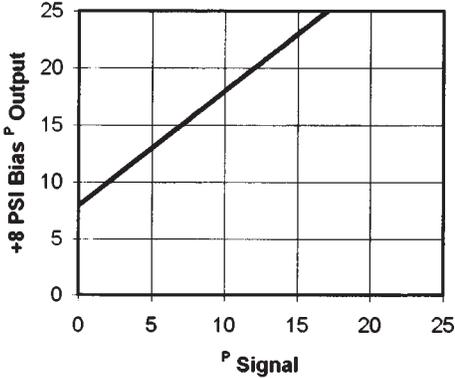
SPECIFICATIONS

- Flow Capacity**50 SCFM (76.5 m³/hr) at 100 psig (700 kPa) supply with 20 psig (140 kPa) output
- Exhaust Capacity**15 SCFM (25.5 m³/hr). Downstream 5 psig (35 kPa) above set pressure
- Sensitivity**1/4" (3.2 mm) water column
- Effect of Supply Pressure Change**0.1 psi for a 50 psig change
- Maximum Supply Pressure**250 psig (1750 kPa)
- Maximum Signal Pressure**150 psig (1034 kPa)
- Maximum Output Pressure**150 psig (1034 kPa)
- Ambient Temperature Limits**-40°F to 200°F (-40C to 93°C)
- Weight**1.75 lbs. (635 gm)
- Mounting**pipe, panel or bracket

FLOW CHARACTERISTICS



BIAS CHARACTERISTICS

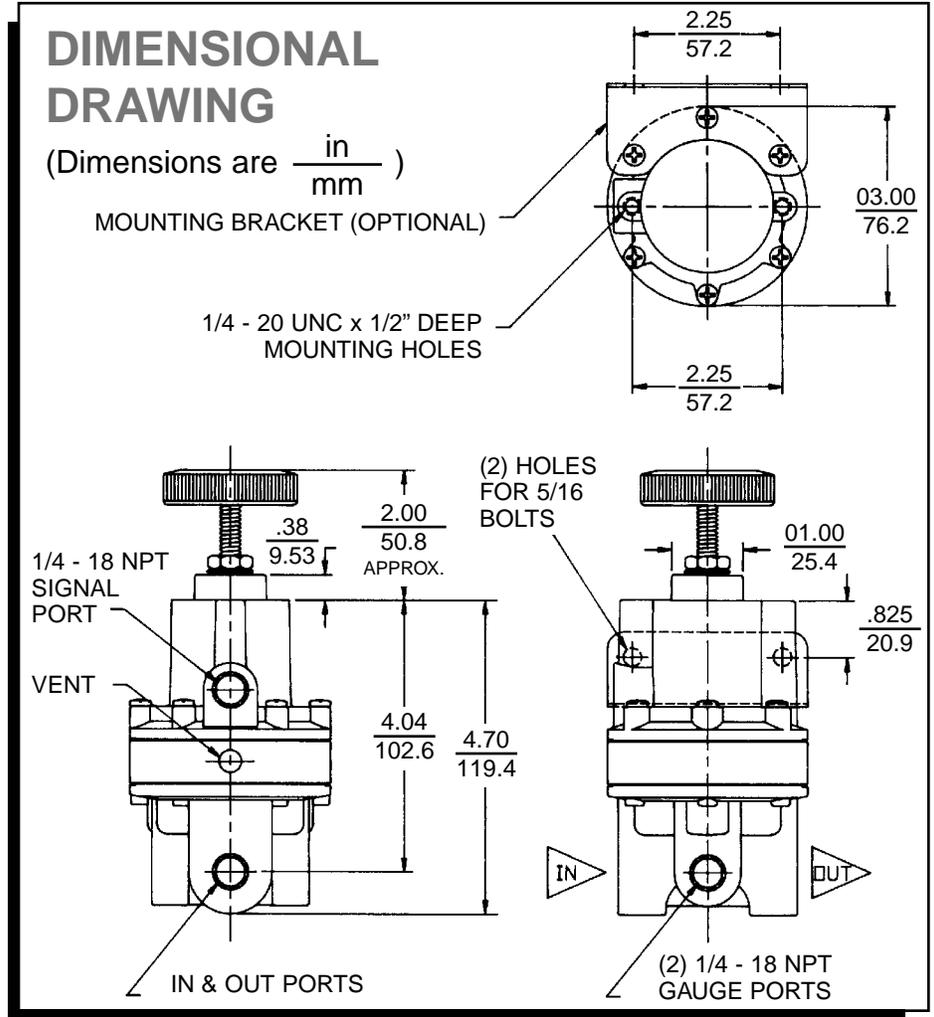


A typical curve of output pressure versus signal pressure with a bias of +8 psig (56 kPa) is shown.

$$P_{\text{Output}} = P_{\text{Signal}} + K_{\text{Bias}}$$

DIMENSIONAL DRAWING

(Dimensions are $\frac{\text{in}}{\text{mm}}$)



ORDERING INFORMATION

Type-650 Positive Bias Relay

Part Number	Port Size (NPT)	Bias Range	
		psi	kPa
650-BC	1/4"	0-15	0-105
650-BD	1/4"	0-30	0-200
650-BE	1/4"	1-60	7-400
650-BF	1/4"	2-150	15-1000
650-CC	3/8"	0-15	0-105
650-CD	3/8"	0-30	0-200
650-CE	3/8"	1-60	7-400
650-CF	3/8"	2-150	15-1000

OPTIONS

Add proper letter onto end of model number.

G - Pressure Gage

2" face, back mounted. Dual scale

B - Mounting Bracket

zinc-plated steel bracket for side mounting.

E - Tapped Exhaust

allows captured exhaust. 1/8" NPT port.

T - Tamperproof Cover

prevents casual adjustment of bias setting.



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OTHER PRODUCTS FROM CONTROLAIR



**Type-100
Precision Air
Pressure Regulator**
This compact unit controls output pressure to within 0.1% accuracy.



**Type-100M
Motorized Air
Pressure Regulator**
This accuracy of the Type-100 in combination with electric control.



**Type-200
Precision
Biasing Relay**
Signal operated regulator that provides very precise control of output pressure with positive and negative biasing capability.



**Type-300
Instrument Air
Filter Regulator**
Economical alternative for providing clean, regulated air to instruments, valves and other automatic control equipment.



**Type-350SS
Stainless Steel
Filter Regulator**
Designed to provide instrument quality air in corrosive environments.



**Type-400
General Service
Regulator**
High regulation performance at low cost.



**Type-500X
Electropneumatic
Transducer (I/P, E/P)**
Converts a current or voltage input signal to a linearly proportional pneumatic output pressure.



**Type-600
Ratio Relay
Volume Booster**
Uses a pneumatic signal to produce an output pressure which has high flow capacity and can be amplified.



**Type-700
High Flow
Capacity
Precision Air
Pressure
Regulator**
Flows up to 80 SCFM with minimum droop.



**Type-700BP
Precision Back
Pressure
Regulator**
Operates as a high flow capacity, quick response relief valve with an adjustable set point.



**Type-800
Subminiature
Precision Air
Pressure
Regulator**
Compact unit provides high precision pressure regulation for applications where space is limited.



**Type-850/860
Miniature
Air/Water
Pressure
Regulator**
General service regulator provides stable output pressure in a small, economical package.



**Type-900X
Electropneumatic
Transducer (I/P, E/P)**
Internal feedback system provides accurate conversion of a variable electrical signal to a linearly proportional pneumatic signal.



**Type-950XP
Explosion Proof
Transducer (I/P)**
Compact I/P transducer in an explosion-proof housing delivers reliable performance for hazardous areas.

Diaphragm Air Cylinders

Provides virtually frictionless conversion of fluid pressure to linear mechanical force. Utilizes a rolling diaphragm for a low hysteresis, no blow by positive seal.



Custom Pneumatic Devices

ControlAir designs and manufactures custom devices usually incorporating the performance advantages of rolling diaphragm seals

LIMITED WARRANTY & DISCLAIMER

ControlAir, Inc. products are warranted to be free from defects in materials and workmanship for a period of eighteen months from the date of sale, provided said products are used according to ControlAir, Inc. recommended usages. ControlAir, Inc.'s liability is limited to repair of, refund of purchase price paid for, or replacement in kind of, at ControlAir, Inc.'s sole option, any products proved defective. ControlAir, Inc. reserves the right to discontinue manufacture of any products or change product materials, designs or specifications without notice.

WARNING

These products are intended for use in industrial compressed-air systems only. Do not use these products where pressures and temperatures can exceed those listed under Specifications. Before using these products with fluids other than air, for nonindustrial application, life-support systems, or other applications not within published specifications, consult ControlAir, Inc.

APPLICATION AND ENGINEERING ASSISTANCE

ControlAir engineers are always available to provide answers to any question that you might have about product performance or applications. We encourage you to give us a call at (603) 886-9400.



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