

VRP-SB-PID Series Valve Regulation Pilot

VRP-SB-PID Controller provides ZERO steady state bleed pressure control, specifically designed for power plant type pressure control and double-stage pressure cuts

Description

The Becker Model VRP-SB-CH Single-Acting Pilot provides pressure control when utilized with a single-acting actuated control valve. The VRP-SB-CH measures process sensing pressure and positions the single-acting actuator to maintain the pressure setpoint. The VRP-SB-CH Pilot may be utilized for pressure control applications with setpoints ranging from 1.0 psig to 1300 psig (6.9 kPa – 8964 kPa). The VRP-SB-CH features zero steady state bleed and may incorporate Becker's unique BPS™ Bleed to Pressure System capability to completely eliminate atmospheric emissions.



Figure 1.0 - Becker Model VRP-600-SB-PID pressure control system. Direct Acting configuration shown.

VRP-SB-PID Applications

- Pressure Control
- Power Plant Type Pressure Control
- Two Stage Pressure Cut (1st Stage)

Compatible Actuators

- RPSR Series
- LPSR Series
- LD Series
- Type 33 (Paramax™) Series

Improve Performance and Minimize Bleed Gas Emissions!

Optimum performance is achieved by pairing the VRP-SB-CH with genuine Becker control valve actuators. If you already have existing control valve actuators in service, the addition of a VRP-SB-CH can improve performance and minimize bleed gas emissions. Becker VRP-SB-CH Pilots are compatible for retrofit with most manufacturer's single-acting actuators. Consult Becker Precision Equipment for more information.

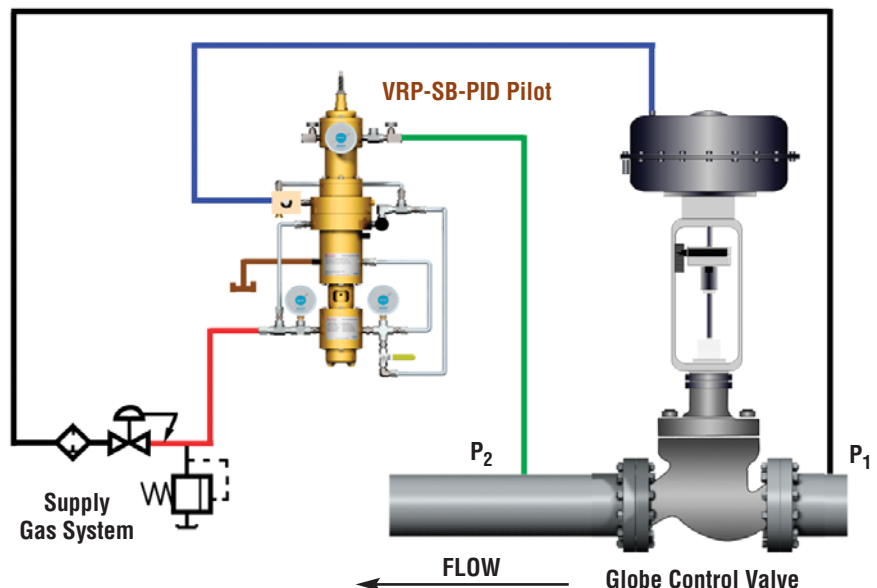
Guidelines for Usage (Restrictions)

- **Short Systems:**
The VRP-SB-PID controller is designed for use on short systems that require a quick response. VRP-SB-PID is not recommended for large, slow systems. For systems not requiring a quick response, the VRP-SB-CH pilot may be used.
- **RPSR Actuators:**
Becker VRP-SB-PID Series Controllers can only be used with RPSR actuators when the setpoint is above 70 psig. If the setpoint for a VRP-SB-PID is lower than 70 psig, an HPP series positioner must be used in conjunction with the VRP-SB-PID on RPSR actuators.

Schematic Legend

- Sensing Pressure (P_2)
- Upstream Pressure (P_1)
- Exhaust (Discharge)
- Supply Gas (Regulated)
- Intermediate Pressure (Actuator)

Figure 2.0



The VRP-SB-PID is ideal for power plant pressure control and double-stage pressure cuts utilizing ZERO Bleed Technology.

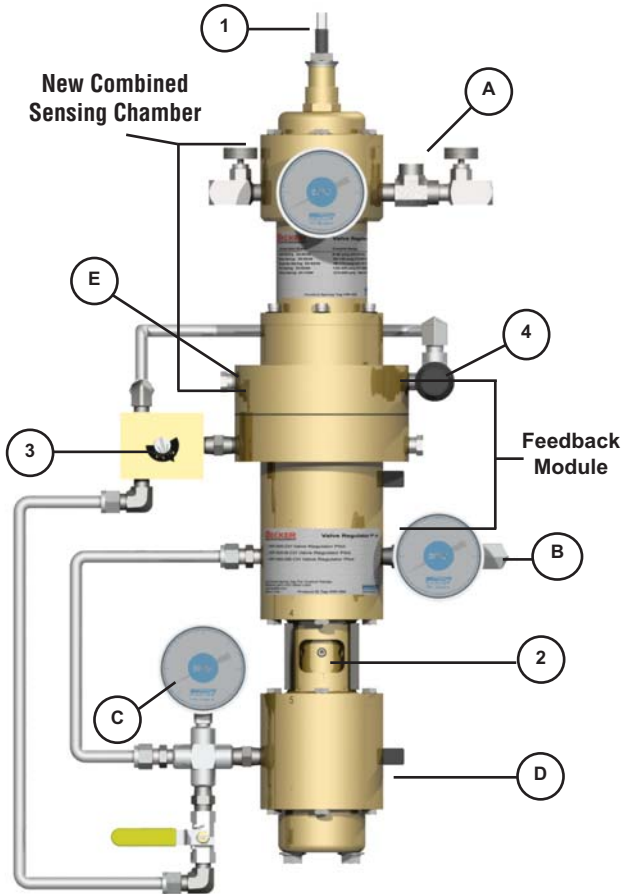


Figure 3.0 - Becker Model VRP-600-B-CH pressure control system. The VRP-SB-PID is specifically designed for use in natural gas pressure regulation and provides a more reliable alternative to conventional pressure controllers

Benefits of the VRP-SB-PID Controller

- Zero atmospheric bleed when the control valve is in steady state, full open, and full closed positions.
- Ideally suited for power plant pressure control.
- Becker’s unique Bleed to Pressure System™ feature allows for complete elimination of atmospheric bleed gas by maintaining exhaust gas within the process piping.
- Sensing pressure up to 1300 psig.
- VRP-SB-PID Pilot sensitivity is ±0.75%.
- The VRP-SB-PID has a fixed gain that is the same throughout the entire stroke of the actuator.
- Two adjustments, derivative and reset, allow for accurate and stable control of any short system.
- The VRP-SB-PID includes the combination chamber where the sensing pressure and the control spring are combined in the same chamber so that only the “net force” is transmitted to the VRP-SB-PID Body allowing greater sensitivity of the controller.
- The VRP-SB-PID control spring is totally enclosed and protected from potentially corrosive effects of the atmosphere.
- The VRP-SB-PID has a large flow capacity to directly feed large actuators. No need for a positioner to act as an amplifier.
- The VRP-SB-PID is field configurable to a PD controller.
- Vibration resistant design will perform in the most demanding apps. and maintain calibration. No annual adjustments required.
- Anodized AL 2024 Aluminum and Stainless Steel construction provide rugged durability for a long service life.
- Ideally suited for different two-stage pressure cut regulation.

Improve Performance and Minimize Bleed Gas Emissions!

Optimum performance is achieved by pairing the VRP-SB-PID with genuine Becker control valve actuators. If you already have existing control valve actuators in service, the addition of a VRP-SB-PID can improve performance and minimize bleed gas emissions. Becker VRP-SB-PID Pilots are compatible for retrofit with most manufacturer’s double-acting piston style actuators. Consult Becker Precision Equipment for more info.



VRP-SB-PID Port Definitions	Port Size	Item
Sensing (Input)	¼” FNPT	A
Power Gas Supply (Input)	¼” FNPT	B
Loading (Output)	¼” FNPT	C
Exhaust (Discharge)	¼” FNPT	D
Breather Vents	¼” FNPT	E

Reference Figure 4.0

VRP-SB-PID Adjustments	Item
Setpoint Elevation Adjustment	1
Deadband (Sensitivity)	2
“Loading” Adjustable Orifice	3
“Exhaust” Adjustable Orifice	4

Reference Figure 4.0

VRP-SB-PID Series Valve Regulation Pilot

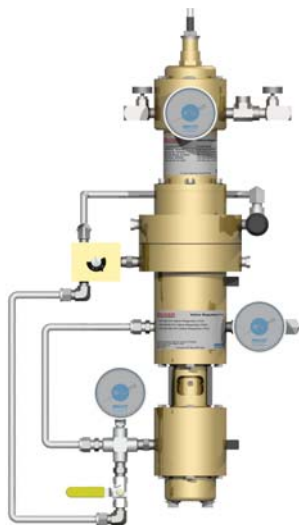


Figure 4.0 - Becker Model VRP-600-SB-PID-40 Direct Acting



Figure 5.0 - Becker Model VRP-600-SB-PID-40 Reverse Acting



Figure 6.0 - VRP-SB-PID For Underpressure Protection

A Becker Ball Valve Regulator (T-Ball) was installed in parallel with existing flexible element regulators on natural gas feed into fertilizer manufacturing facility near Port of Suez, Egypt. The fertilizer plant had experienced problems with severe droop of inlet pressure to the facility, necessitating costly operation of a downstream compressor to contend with pressure loss across existing flexible element type regulators. The Becker Ball Valve Regulator was installed to provide negligible pressure drop and minimize need to operate downstream compressor. The maximum differential pressure across the Becker Ball Valve Regulator was less than 0.2 psid at full flow volume. The seamless, reliable and accurate control of the Ball Valve Regulator was achieved via a Becker VRP-SB-PID Valve Regulator Pilot. Upon significant droop of inlet pressure to that station, the "PID" would begin to open the Underpressure protection control valve and ensure accurate control.



Figure 7.0 - VRP-SB-PID Retrofit to "Jetstream" Regulator

A UK based natural gas transmission entity identified high bleed natural gas devices for replacement with Becker VRP-SB-PID Valve Regulator Pilot technology. The customer desired a reliable pneumatic pressure controller that would eliminate steady state bleed gas emissions and allow for east adjustment and maintenance. The VRP-SB-CH was seamlessly installed to replace a Bristol Model 624 Pressure Controller and eliminate the constant fugitive emissions. Additionally, it must be noted that most manufacturer's pneumatic control instrumentation is not "gas tight" allowing build up of hazardous natural gas within enclosures and buildings. The Becker VRP-SB-PID is completely gas tight and ensures that all natural gas emissions are directly completely outside of buildings and enclosures. This provides significant improvement in safety for operating personnel.



Figure 8.0 - Becker VRP-SB-PID Installed On A Becker Ball Valve Power Plant Monitor

A pair of Becker VRP-600-SB-PID-125 are installed on Becker RPSR spring return actuators and 4" Becker ball valve monitors feeding a combustion turbine fired power plant. The VRP-SB-PID provides self-contained overpressure protection in the event the working regulators fail. Normally the valves remain in the full open position. The VRP-SB-PID insures quick response to avoid any pressure fluctuations in the fuel gas feed to the turbines in the event the monitor valve is called into action. The RPSR actuators are designed to fail closed in event of power gas failure.



Figure 9.0 - Skid Mounted Becker Power Plant Monitor With A Becker VRP-SB-PID

Dual skid mounted fuel gas runs include 6" Becker ball valve monitors complete Becker RPSR spring return actuators and Becker VRP-600-SB-PID-125. A Becker VB-250 volume booster is required on the output of the VRP-SB-PID to provide high-speed response due to the larger volume of the actuator cylinder. The VB-250 together with the VRP-SB-PID is the ideal combination to avoid pressure spikes and fluctuations that could cause the power plant to shut down. The complete monitor valve package includes the Becker FD-1 gas supply system for gas conditioning and regulation.



Figure 10.0 - Becker Designed Combustion Turbine Power Plant Fuel Gas Station

A control valve station utilizing Becker station design philosophy feeds a combustion turbine power plant. The station consists of a 2" low flow/trimmer run using Becker globe valve regulators in a worker - monitor configuration. Two 8" high capacity runs consist of Becker ball valve regulators are also in a worker - monitor configuration. The high capacity runs are completely redundant for maintenance reasons. All regulators include the Becker VRP-SB-PID that work together to provide stable pressure to the plant while maintaining zero steady state bleed. The VRP-SB-PID that are installed on the high capacity runs include the Becker VB-250 to insure high-speed of response due to the large volume changes possible from the actuator cylinder. The high gain response of the VRP-SB-PIDs minimizes pressure fluctuations during load changes and eliminates valve cycling that could lead to failure from excessive wear.

How it Works (Downstream Pressure Control)

VRP-SB-PID configuration shown is direct acting - VRP-SB-PID output increases on increasing sensing pressure and the control valve will be a “Fail Open” valve. If the VRP-SB-PID is signaling an HPP Series Positioner, the positioner will close the valve on increasing output pressure from the VRP-SB-PID. The energy to operate the control valve is obtained from the differential between supply gas pressure and discharge gas pressure. When the measured variable (sensing) is at setpoint the controller output remains in steady state with zero bleed. From a steady state position, an increase in the sensing pressure causes a downward net force on the sensing diaphragm. The internal pistons move down and load pressure to the actuator or positioner, closing the valve. The measured variable (sensing) returns to setpoint, and the pilot pistons center in the steady state position trapping the pressure in the actuator holding the control valve steady. If the measured variable falls below setpoint, the opposite reaction takes place, opening the valve.

In order to control how much gas passes through the balanced valve, the output pressure is fed back to the bottom side of a diaphragm within the feedback module. The feedback module incorporates derivative and reset adjustments. As the output pressure increases, the feedback pressure closes the supply valve. As the output pressure decreases, the feedback pressure decreases, closing the exhaust valve. The feedback force is such that the output pressure will change proportionally with the deviation of the sensing pressure from setpoint, which gives the VRP-SB-PID a proportional response. By restricting the flow of the output pressure to the feedback diaphragm, a derivative function is introduced, and the feedback force is delayed. This delay allows the output to change quickly in response to quick change in the system. Slow changes in the system; however, are less affected by the derivative orifice because the output pressure has time to equalize on both sides of the orifice. If the restriction is too great, the feedback delay will be too long and the system will become unstable.

Because the change in output pressure is proportional to the deviance of the sensing pressure from setpoint, a sensing pressure that is not at the setpoint is required to maintain a particular change in output pressure. The difference between the setpoint and the maintained pressure at a particular output pressure is the “offset”. This offset can be eliminated over time by introducing a reset function on the top side of the feedback diaphragm to slowly equalize with the bottom side. If the reset function causes the top side of the diaphragm to equalize with the bottom side too quickly, the feedback function providing proportionality is cancelled out and control will become unstable.

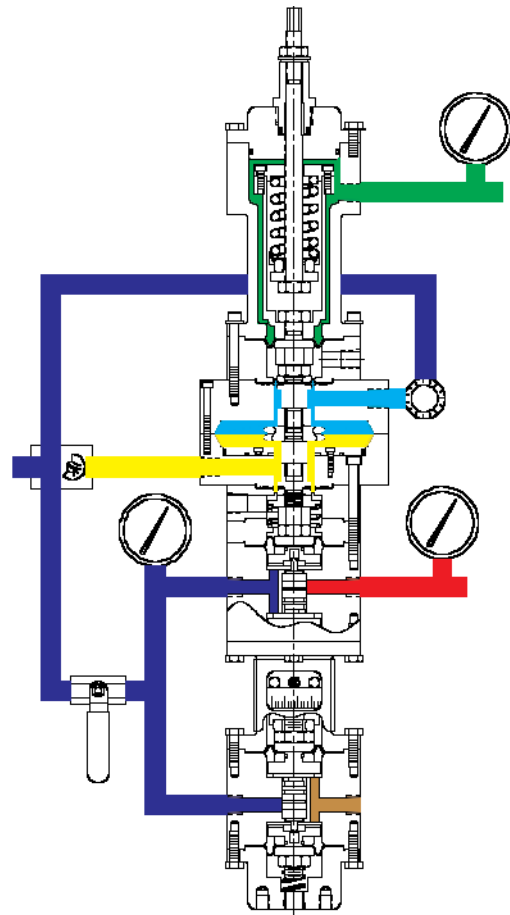


Figure 11.0 – Direct Acting VRP-SB-PID Controller

Schematic Legend

- Atmospheric Pressure
- High Pressure Gas
- Cylinder Loading Pressure (High Pressure)
- Cylinder Loading Pressure (Medium Pressure)
- Cylinder Loading Pressure (Low Pressure)
- Measured Variable (Downstream Pressure)

Table 1.0 - Technical Specifications for Model VRP-SB-PID Controller

Technical Specifications	
Steady State Gas Consumption	ZERO (see table 2.0)
Supply Gas	dry, filtered (100 micron) gas
Maximum Flow Capacity	2400 scfh (40 scmh)
Maximum Supply Pressure	Model Specific* Operative Ambient
Operative Ambient Temperature Range	-20°F to 160°F (-29°C to 71°C)
Approximate Weight	25 pounds (9.1 kg)
Minimum Deadband	0.2% instrument signal
Independent Linearity	+/- 1.0% of positional range
Control Accuracy	+/- 0.75% of setpoint
Maximum Sensing Pressure	1300 psig (8963 kPa)
Setpoint Range	35 psig - 1300 psig (172 kPa - 8966 kPa)
Housing	meets NEMA 3 Classification
Installation Orientation	Vertical position recommended. Custom bracket supplied with Becker Actuators. 2" pipe mount provided for retrofit to other manufacturers actuators.
Materials of Construction	
External Parts	anodized AL 2024 316 SS available (for marine environments)
Internal Parts	316 SS and anodized AL 2024
Springs	plated steel
Diaphragms	buna-n reinforced by nylon fabric
Seats and O-rings	buna-n
Tubing and Tubing Fittings	316 SS
Guages	2 1/2" dial liquid filled brass connection w/stainless steel case* (standard issue with units of psig dual units of psig/kPa available)

Notes

1. Direct Acting: increasing instrument signal causes control valve to open (fail closed upon loss of instrument signal)
2. Reverse Acting: decreasing instrument signal causes control valve to open (fail open upon loss of instrument signal)

* Model Specific Maximum Supply Pressure:
 VRP-SB-PID-40 has 40 psig max.
 VRP-SB-PID-80 has 80 psig max.
 VRP-SB-PID-150 has 150 psig max.

Table 2.0 - Bleed Rates (consumption) for Becker Control Instrumentation

Becker control instrumentation features low bleed & zero bleed technologies to minimize fugitive natural gas emissions and environmental impact.

	VRP-CH Pilot	VRP-B-CH Pilot	VRP-SB-CH Pilot	VRP-SB-PID Pilot	HPP-4 Positioner	HPP-5 Positioner	HPP-SB Positioner	EFP Positioner
Bleed Rates (Consumption)								
Steady State Bleed* Non-Bleed	~100	<10	zero	zero	~100	<10	zero	zero
Full-Open/Full Closed Bleed to Pressure	Y ₁	Y ₂	Y	Y	Y ₁	Y ₂	Y	Y
Bleed to Pressure System (BPS™) †	Y	Y	Y	Y	Y	Y	Y	Y

Notes

- * Bleed rates are estimated utilizing Supply Gas Pressure = 100 psig
1. Requires Model PS-2 or NBV Non-Bleed Device to eliminate bleed
 2. Requires Model DPS-2 or NBV Non-Bleed Device to eliminate bleed
- † Bleed to Pressure System (BPS™) eliminates all atmospheric Bleed

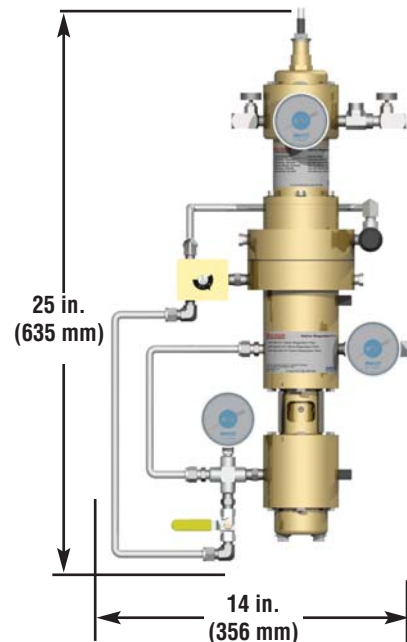


Figure 12.0 - Overall dimensions of Becker Model VRP-600-SB-PID-40 Controller (Direct Acting)

VRP-SB-PID Series Valve Regulation Pilot

Table 3.0 - Selection Chart for VRP-SB-CH Series Pilots

VRP-SB-PID Model Number	Control Range (psig/kPa)	Spring Color	Part Number	Controller Coefficient, K			Proportional band with 3-15 psig output		
VRP-600-SB-PID-40	35 – 60 psig 172 – 414 kPa	Gold	25-8236	0.234	0.334	0.523	51 psi 352 kPa	36 psi 248 kPa	23 psi 159 kPa
	45 – 135 psig 310 – 1103 kPa	Beige	25-8238						
	70 – 195 psig 483 – 1345 kPa	Burgundy	25-8239						
	155 – 320 psig 1069 – 2206 kPa	Pink	25-8240						
	295 – 600 psig 2034 – 4137 kPa	Yellow	25-1306						
VRP-1000-SB-PID-40	115 – 330 psig 793 – 2275 kPa	Burgundy	25-8239	0.138	0.197	0.308	87 psi 600 kPa	61 psi 421 kPa	39 psi 269 kPa
	260 – 540 psig 1793 – 3723 kPa	Pink	25-8240						
	500 – 1000 psig 3448 – 6895 kPa	Yellow	25-1306						
VRP-1300-SB-PID-40	820 – 1300 psig 5654 – 8964 kPa	Gray	25-1562	0.138	0.197	0.308	87 psi 600 kPa	61 psi 421 kPa	39 psi 269 kPa

Notes

1. These models should only be used for applications that require high gain. Consult Becker prior to specifying these models.
2. Maximum Remote Setpoint Range is based upon Model SM-1140 Remote Setpoint Module with maximum motor range of 5.8 revolutions. See Becker brochure RSM for additional information.
3. Maximum Remote Setpoint Range reported is applicable to units with discrete (pulse) signal. Remote Setpoint Modules with analog (4-20 mA) signal have a Maximum Remote Setpoint Range equal to the full Control Range of the VRP-SB-CH Pilot.



Figure 13.1 - Model VRP-600-SB-PID-40 (Reverse Acting)

Repair Kit Number 30-9306



Figure 13.2 - Model VRP-1000-SB-PID-40 (Direct Acting)

Repair Kit Number 30-9307



Figure 13.3 - Model VRP-1300-SB-PID-40 (Direct Acting)

Repair Kit Number 30-9307

Table 4.0 - Selection Chart for VRP-SB-PID-80 Series Natural Gas Controller

VRP-SB-PID Model Number	Control Range (psig/kPa)	Spring Color	Part Number	Controller Coefficient, K			Proportional band with 3-15 psig output		
VRP-600-SB-PID-80	75 – 160 psig 172 – 414 kPa	Beige	25-8238	0.234	0.334	0.523	102 psi 703 kPa	72 psi 496 kPa	46 psi 317 kPa
	95 – 220 psig 655 – 1517 kPa	Burgundy	25-8239						
	180 – 345 psig 1241 – 2374 kPa	Pink	25-8240						
	320 – 600 psig 2206 – 4137 kPa	Yellow	25-1306						
VRP-1000-SB-PID-80	155 – 370 psig 300 – 580 kPa	Burgundy	25-8239	0.138	0.197	0.308	174 psi 1200 kPa	122 psi 841 kPa	78 psi 538 kPa
	300 – 580 psig 2069 – 4000 kPa	Pink	25-8240						
	540 – 1040 psig 3723 – 7171 kPa	Yellow	25-1306						
VRP-1300-SB-PID-80	860 – 1300 psig 5930 – 8969 kPa	Gray	25-1562	0.138	0.197	0.308	174 psi 1200 kPa	122 psi 841 kPa	78 psi 538 kPa

Notes

1. Proportional Band = $\frac{\text{output range}}{k}$
2. Use VRP-SB-PID when 40 psig (276 kPa) < power gas < 80 psig (552 kPa)



Figure 14.1 - Model VRP-600-SB-PID-80 (Reverse Acting)

Repair Kit Number 30-9306



Figure 14.2 - Model VRP-1000-SB-PID-80 (Direct Acting)

Repair Kit Number 30-9307



Figure 14.3 - Model VRP-1300-SB-PID-80 (Direct Acting)

Repair Kit Number 30-9307

VRP-SB-PID Series Valve Regulation Pilot

Table 5.0 - Selection Chart for VRP-SB-PID-125 Series Natural Gas Controller

VRP-SB-PID Model Number	Control Range (psig/kPa)	Spring Color	Part Number	Controller Coefficient, K			Proportional band with 3-15 psig output		
VRP-600-SB-PID-125	115 – 195 psig 724 – 1517 kPa	Beige	25-8238	0.234	0.334	0.523	127.5 psi 879 kPa	90 psi 621 kPa	57.5 psi 396 kPa
	130 – 255 psig 896 – 1750 kPa	Burgundy	25-8239						
	215 – 380 psig 482 – 2620 kPa	Pink	25-8240						
	355 – 600 psig 2448 – 4137 kPa	Yellow	25-1306						
VRP-1000-SB-PID-125	215 – 430 psig 1482 – 2967 kPa	Burgundy	25-8239	0.138	0.197	0.308	217.5 psi 1500 kPa	152.5 psi 1051 kPa	97.5 psi 672 kPa
	360 – 640 psig 2482 – 4413 kPa	Pink	25-8240						
	600 – 1100 psig 4137 – 7585 kPa	Yellow	25-1306						
VRP-1300-SB-PID-125	920 – 1300 psig 6343 – 8964 kPa	Gray	25-1562	0.138	0.197	0.308	217.5 psi 1500 kPa	152.5 psi 105 kPa	97.5 psi 672 kPa

Notes

1. Proportional Band = $\frac{\text{output range}}{k}$
2. Use VRP-SB-PID when 40 psig (276 kPa) < power gas < 80 psig (552 kPa)



Figure 13.1 - Model VRP-600-SB-PID-125 (Reverse Acting)

Repair Kit Number 30-9306



Figure 13.2 - Model VRP-1000-SB-PID-125 (Direct Acting)

Repair Kit Number 30-9307



Figure 13.3 - Model VRP-1300-SB-PID-125 (Direct Acting)

Repair Kit Number 30-9307

VRP-SB-PID Series Pilot Accessories

Realize Optimum Performance of your VRP-SB-PID Series Pilot with these popular instrumentation accessories!



Bleed to Pressure System (BPS™)

All Becker control instrumentation feature the unique capability to discharge vent gas into the downstream pipeline or alternate low pressure gas system. This feature is exclusive to Becker and provides complete elimination of atmospheric bleed gas emissions.



AB Series Atmospheric Bleed Control

When conditions allow discharge to pressure system only part of the time, install an AB-Control for automatic switching that temporarily permits atmospheric bleed. The AB-Control will maintain adequate differential pressure between supply gas pressure and discharge pressure to operate the control valve actuator and the control instrumentation. The AB-Control is not applicable when the control instrumentation constantly discharges to atmosphere.

Reference Becker AB Atmospheric Bleed Sales Literature for additional information.



RSM Series Remote Setpoint Module

The Remote Set Point Module provides remote adjustment of VRP Pilot set point via an electrical input signal. All Remote Setpoint Motors are equipped with internal limit switches to prevent over-travel of setpoint. 4-20 mA feedback of Remote Setpoint Module motor standard. All Becker RSM Series Remote Setpoint Modules are rated Explosion Proof Class 1, Div. 1 for use in hazardous locations. Standard RSM input signals are:

Digital Pulse Input

- 24 VDC
- 120 VAC

Analog Current Input

- 4-20 mA command signal/24 VDC Supply Power
- 4-20 mA command signal/120 VAC Supply Power

Reference Becker RSM Remote Setpoint Module Sales Literature for additional information.



SP Series Setpoint Pump

Provides a simple and accurate method of applying false signal pressure during initial adjustment of the VRP-SB-CH pilot. The pump can provide a false signal pressure of 20%-50% in excess of working pipeline pressure which eliminates the need for nitrogen bottles or electronic calibration devices. The SP Series Setpoint Pump is compatible with all models and series of Becker VRP Pilots.

Reference Becker SP Setpoint Pump Sales Literature for additional information.



VB Series Volume Boosters

VB Series Volume Boosters are utilized in conjunction with Becker control instrumentation to provide adequate instrumentation flow volume for larger volume piston actuators. Volume Boosters are typically only required for Ball Valve Regulators model 12T and larger. Additionally, Volume Boosters may be utilized to provide increased actuator stroking speed when applications require, such as power plant and other short system applications. As with all Becker instrumentation, Volume Boosters may be discharged into a lower pressure system to eliminate atmospheric bleed. Volume Boosters are compatible with the VRP-SB-CH Valve Regulator Pilot.

VRP-SB-PID Series Pilot Accessories

Realize Optimum Performance of your VRP-SB-PID Series Pilot with these popular instrumentation accessories!



Panel Mounting

Custom panel mounting is available to suit the specific needs of your application. All panels come fully assembled, tested and adjusted per your requirements. Panel mounting simplifies retrofit of Becker instrumentation to existing equipment and ensures satisfactory performance and fit. A variety of configurations and options are available.



Stainless Steel Option

All Becker Precision Control instrumentation is manufactured from high-strength anodized aircraft aluminum alloy (AL2024). The standard aluminum construction typically will provide adequate durability in most installation environments. In applications where the installation environment is unusually harsh, the instrumentation may be specially ordered in a stainless steel option. The stainless steel option is typically utilized in the following areas:

- Marine environments
- Chemical plants
- Offshore platforms
- Coastal regions



Figure 16.1 - Before Retrofit

Power plant regulator with typical controller installed on a globe valve with a spring & diaphragm actuator. Constant cycling of control valve and constant bleed to atmosphere. The system required a valve positioner.

Retrofit Compatibility

Optimum performance is achieved by pairing the VRP-SB-PID with genuine Becker control valve actuators and positioners. If you already have existing control valve actuators in service, the addition of a Model VRP-SB-PID can improve performance and minimize atmospheric bleed emissions. Becker VRP-SB-PID Pilots are compatible for retrofit with most manufacturer's single-acting spring & diaphragm or spring & piston type actuators and positioners. Consult Becker Precision Equipment for assistance.

- Fisher Type 1051/1052™ Rotary spring & diaphragm type actuators
- Fisher Type 657/667™ Linear spring & diaphragm type actuators
- Welker Jet® Control Valves
- Compatible with other manufacturer's system, consult Becker for assistance
- Most manufacturer's spring & diaphragm or spring & piston style valve actuators



Figure 16.2 - After Retrofit

Power plant regulator retrofit with Becker VRP-SB-PID Controller on same control valve and actuator. Stable pressure control to power plant with ZERO atmospheric bleed in steady state. The need for a valve positioner was eliminated.

Table 6.0 - Application Guidelines for Becker Control Instrumentation	VRP-CH Pilot	VRP-B-CH Pilot	VRP-SB-CH	VRP-SB-PID	HPP-4 Positioner	HPP-5 Positioner	HPP-SB Positioner	EPF Positioner	Notes
Applications									
Pressure Control	•	•	•	•	•	•	•	•	1,2
Flow Control					•	•	•	•	2
Power Plant Type Pressure Control	•			•	•		•	•	3
Power Plant Type Flow Control					•	•	•	•	3
Surge Control					•		•		
Compatible Actuators									
RPDA Series (Small Models)	•	•			•	•		•	4
RPDA Series (Large Models)	•				•			•	5
RPSR Series			•	•				•	
LPDA Series (Small Models)	•	•			•	•			4
LPDA Series (Large Models)	•				•			•	5
LPSR Series			•	•				•	
LD Series			•	•				•	6
Instrumentation Options									
Bleed to Pressure System BPS™	•	•	•	•	•	•	•	•	7
AB Series Atmospheric Bleed Control	•	•	•	•	•	•	•	•	
NBV Series No-Bleed Valve	•	•			•	•			8
DPS-2 Series Non-Bleed Sensor		•				•			9
PS-2 Series Non-Bleed Sensor	•				•				9
SP Series Setpoint Pump	•	•	•	•					
RSM Series Remote Setpoint Module	•	•	•	•					
Panel Mounting	•	•	•	•				•	
Stainless Steel Option	•	•	•	•	•	•	•		
VB Series Volume Booster	•		•	•	•				10
QEV Series Quick Exhaust Valve					•	•	•		
I/P Transducer					•	•	•		
SLV Series Signal Lock Valve					•	•	•		

1. Pressure Control applications include: pressure letdown, primary regulation, monitors, standby, overpressure protection, underpressure protection, and relief valves.
2. All Positioners require controller device to perform pressure control or flow control.
3. Power Plant Regulation includes all power plants and "fast-acting" short systems.
4. RPDA, SYDA & LPDA Small Models defined as actuator sizes < 2000 in³ (32,774 cm³)
5. RPDA, SYDA & LPDA Large Models defined as actuator sizes > 2000 in³ (32,774 cm³)
6. LD Series Actuators are limited to Becker CVE Series Globe Valves
7. BPS™ is limited to discharge pressure systems below 300 psig (2068 kPa). Consult Becker for application assistance.
8. NBV No-Bleed Valves may only be utilized when P_{discharge} < 60 psig (414 kPa) and/or P_{supply} < 150 psig (1034 kPa).
9. PS-2 & DPS-2 Non-Bleed Sensors must be utilized when P_{discharge} > 60 psig (414 kPa) and/or P_{supply} > 150 psig (1034 kPa).
10. VB Series Volume Boosters are necessary for Power Plant Regulation, Surge Control Applications, or when Large Model SYDA, RPDA & LPDA Series Actuators are utilized.



Figure 17.0 - Becker Ball Valve Power Plant Regulator Utilizing The Becker VRP-SB-PID

A Becker VRP-600-SB-PID-125 is installed on a Becker ball valve regulator used as a monitor control valve. The VB-250 volume booster provides increased gain to minimize pressure spikes in a small amount of time without any overshoot. The VRP-SB-PID has zero bleed when the valve is in steady state, full open, and full closed positions. The VRP-SB-PID has a fixed gain resulting in only two adjustments to fine tune control. Valve cycling and large pressure fluctuations are eliminated with the VRP-SB-PID's ability to maintain precise control.

***CAUTION:** This information is intended as a guideline for application of Becker Precision Equipment products. Becker strongly recommends consulting Becker Engineering prior to application of any product.

www.BPE950.com

Additional Resources are available on our website. Sales literature, sizing software, and technical manuals are available for download at www.bpe950.com

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