

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-PID is a three mode, proportional integral derivative, controller providing pressure control when utilized with a single-acting actuated control valve or in tandem with a pneumatic positioner. The VRP-SB-PID measures process sensing pressure adjusting the signal to the positioner or actuator to maintain the pressure setpoint. The VRP-SB-PID Controller is ideal for short pressure control applications such as power plant regulation and double-stage pressure cuts with setpoints ranging from 35 to 1300 psig. An output feedback module is added to the VRP-SB-CH design allowing the controller to respond quickly and avoid cycling of the pressure system.



Figure 1 - Becker Model VRP-600-SB-PID (Direct-Acting)

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
- V-Max Series

Improve Performance and Minimize Bleed Gas Emissions!

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

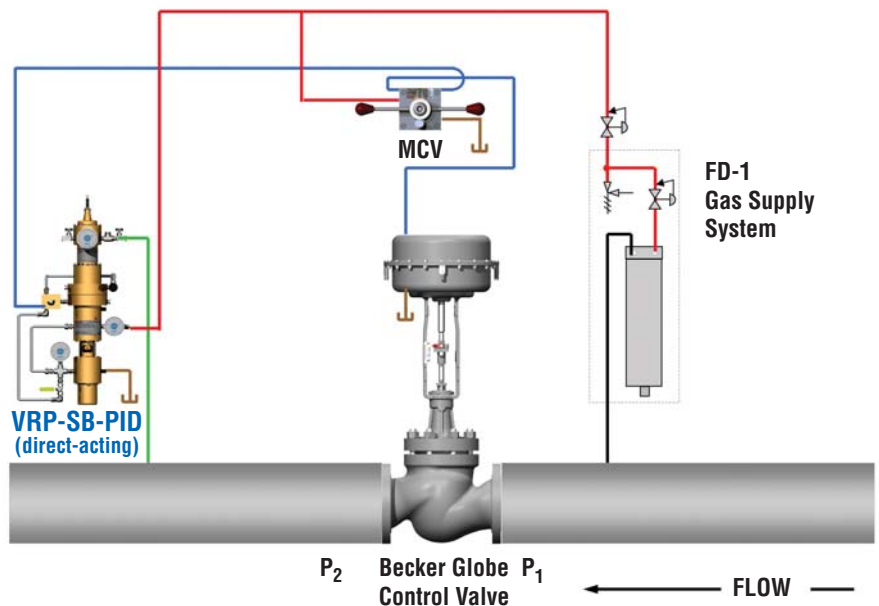
Guidelines for Usage (Restrictions)

• 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
- Line Pressure P_1
- Exhaust (Discharge)
- Power Supply (Regulated)
- Loading Pressure (Actuator)

Figure 2 - Becker Model VRP-600-SB-PID

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

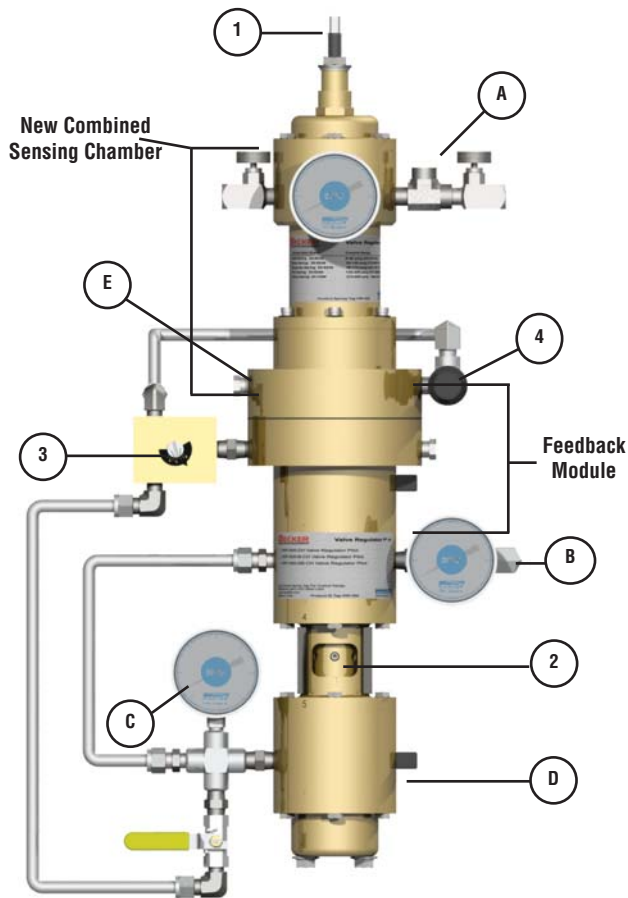


Figure 3 - Becker Model VRP-600-SB-PID pressure control system. The VRP-SB-PID is specifically designed for use in natural gas pressure regulation and provides a more reliable alternative to conventional pressure controllers

Table 1 - VRP-SB-PID Port Definitions

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

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
- Sensing pressure up to 1300 psig
- Sensitivity of ±0.75%
- Fixed gain throughout actuator stroke
- Available with three different gains
- Two adjustments, derivative and reset, allow for accurate and stable control of any short system
- Includes the combination chamber where the sensing pressure and the control spring are combined in the same chamber so only the net force is transmitted to the body allowing controller sensitivity
- Spring is totally enclosed and protected from the atmosphere's potentially corrosive effects
- Large flow capacity to directly feed large actuators, the positioner does not need to act as an amplifier
- Field configurable to a PD controller
- Vibration resistant design performs in the most demanding applications while maintaining 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

Table 2 - VRP-SB-PID Adjustments

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

Reference Figure 4



Figure 4 - Becker Model VRP-600-SB-PID-40 (Direct-Acting)

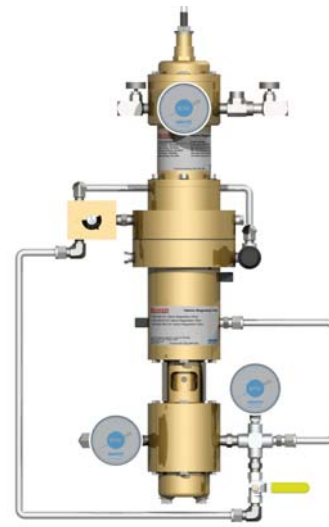


Figure 5 - Becker Model VRP-600-SB-PID-40 (Reverse-Acting)



Figure 6 - VRP-SB-PID For Underpressure Protection

A Becker Ball Valve Regulator 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 (0.02 barg) at full flow volume. The seamless, reliable and accurate control of the Ball Valve Regulator was achieved via a Becker VRP-SB-PID.



Figure 7 - 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 technology. The customer desired a reliable pneumatic pressure controller that would eliminate steady state bleed gas emissions and allow for easy adjustment and maintenance. The VRP-SB-CH was seamlessly installed to replace a competitor's pressure controller and eliminate the constant fugitive emissions. Additionally, it must be noted that most manufacturers' 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 - 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" (100 mm) 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 - Skid Mounted Becker Power Plant Monitor With A Becker VRP-SB-PID

Dual skid mounted fuel gas runs include 6" (150 mm) Becker ball valve monitors complete Becker RPSR Spring Return actuator 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 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 - 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" (50 mm) low flow/trimmer run using Becker globe valve regulators in a worker - monitor configuration. Two 8" (200 mm) 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 a direct-acting VRP-SB-PID, the output increases on increasing sensing pressure and the control valve will fail-open. If the VRP-SB-PID is signaling an HPP Series Positioner, the positioner will close the valve on increasing output pressure. The energy to operate the control valve is obtained from the differential between supply gas pressure and discharge gas pressure. When the sensing pressure 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 sensing pressure 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 sensing pressure falls below setpoint, the opposite reaction takes place, and opens the valve.

In order to control how much gas passes through the balanced valve, the output pressure is fed to a diaphragm within the feedback module. The feedback module incorporates derivative and reset adjustments. As the output pressure increases, the feedback pressure increases, closing 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. 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 rapid system changes. Slow changes in the system, however, are less affected by the derivative because the output pressure has time to equalize on both sides of the orifice. If the flow 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 of the feedback diaphragm to slowly equalize with the bottom. If the reset function causes the top of the diaphragm to equalize with the bottom side too quickly, the feedback function providing proportionality is cancelled out and control will become unstable.

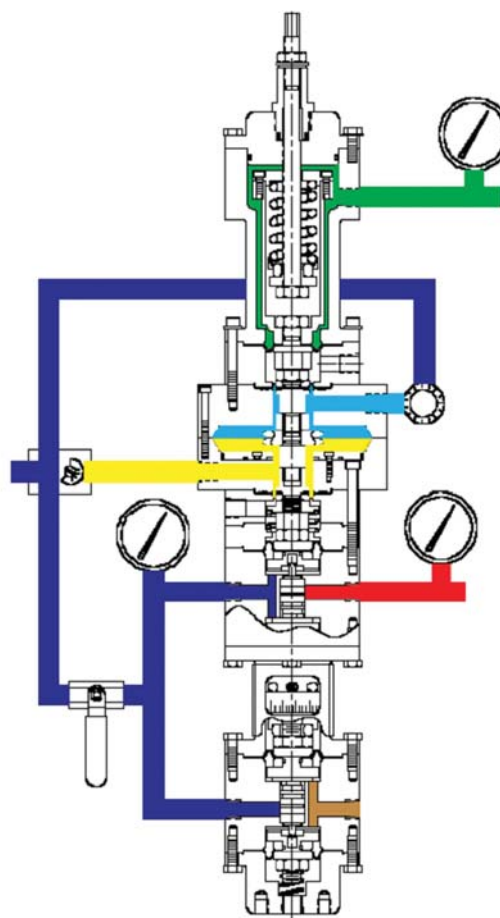


Figure 11 – VRP-SB-PID Controller (Direct-Acting)

Schematic Legend

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

Table 3 - Technical Specifications for Model VRP-SB-PID Controller

Technical Specifications	
Steady State Gas Consumption	ZERO (see Table 4)
Supply Gas	dry, filtered (100 μ) 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	\pm 1.0% of positional range
Control Accuracy	\pm 0.75% of setpoint
Maximum Sensing Pressure	VRP-175 225 psig (1551 kPa) VRP-600 600 psig (4136 kPa) VRP-1000/1300 1500 psig (10342 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
Gauges	2 1/2" dial liquid filled brass connection w/stainless steel case* (standard issue with units of psig/kPa dual units of psig/kPa available)

Notes

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

* Model Specific Maximum Supply Pressure:
 VRP-SB-PID-40 has 40 psig maximum
 VRP-SB-PID-80 has 80 psig maximum
 VRP-SB-PID-125 has 125 psig maximum

Table 4 - Bleed Rates (consumption) for Becker Control Instrumentation

Becker control instrumentation features low bleed and 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-GAP Pilot	VRP-SB-PID Pilot	HPP-4 Positioner	HPP-5 Positioner	HPP-SB Positioner	DNGP Positioner
Bleed Rates (Consumption)									
Steady State Bleed ³ Non-Bleed	~100	<10	zero	zero	zero	~100	<10	zero	zero
Full-Open/Full Closed Bleed to Pressure	Y ₁	N	Y	Y	N	Y ₁	Y ₂	Y	Y
Bleed to Pressure System (BPS™) ⁴	Y	N	Y	Y	N	Y	Y	Y	Y

Notes

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
3. Bleed rates are estimated utilizing Supply Gas Pressure = 100 psig
4. Bleed to Pressure System (BPS™) eliminates all atmospheric Bleed

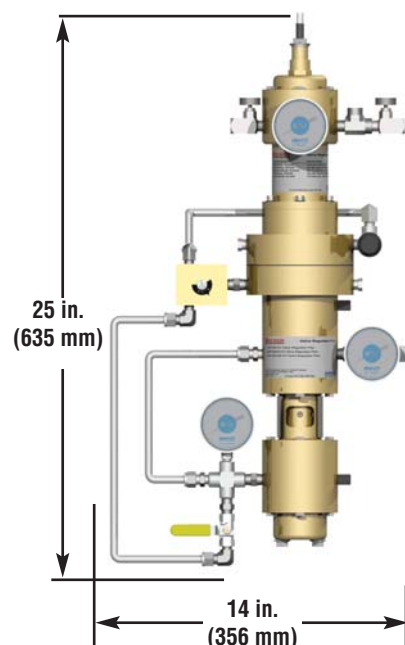
**Figure 12 - Overall dimensions of Becker Model VRP-600-SB-PID-40 Controller (Direct-Acting)**

Table 5 - 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 (241 – 414 kPa)	Gold	25-8236	0.234	0.334	0.523	51 psig (352 kPa)	36 psig (248 kPa)	23 psig (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 psig (600 kPa)	61 psig (421 kPa)	39 psig (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. Proportional Band = output range/k
2. Use VRP-SB-PID-40 when power supply gas < 40 psig (276 kPa)



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

Repair Kit Number 30-9301

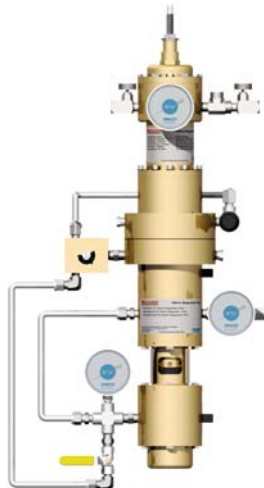


Figure 13.2 - Model VRP-1000-SB-PID-40 (Direct-Acting)

Repair Kit Number 30-9307



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

Repair Kit Number 30-9307

Table 6 - 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 6-30 psig output		
VRP-600-SB-PID-80	70 – 160 psig (483–1103 kPa)	Beige	25-8238	0.234	0.334	0.523	102 psig (703 kPa)	72 psig (496 kPa)	46 psig (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 psig (1200 kPa)	122 psig (841 kPa)	78 psig (538 kPa)
	300 – 580 psig (1069 - 3551 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 psig (1200 kPa)	122 psig (841 kPa)	78 psig (538 kPa)

Notes

1. Proportional Band = 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
(Direct-Acting)

Repair Kit Number 30-9301

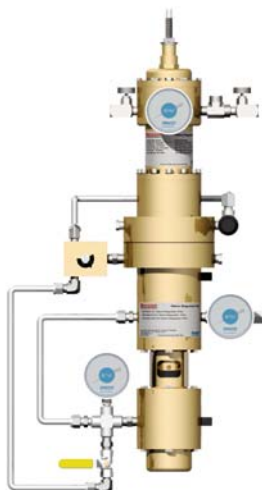


Figure 14.2 - Model VRP-1000-SB-PID-80 (Di-
rect-Acting)

Repair Kit Number 30-9307



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

Repair Kit Number 30-9307

Table 7 - 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 30 psig output		
VRP-600-SB-PID-125	115 – 195 psig (793 - 1344 kPa)	Beige	25-8238	0.234	0.334	0.523	127.5 psig (879 kPa)	90 psig (621 kPa)	57.5 psig (396 kPa)
	130 – 255 psig (896 - 1758 kPa)	Burgundy	25-8239						
	215 – 380 psig (1482 – 2960 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 psig 1500 kPa	152.5 psig 1051 kPa	97.5 psig 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 psig (1500 kPa)	152.5 psig (105 kPa)	97.5 psig (672 kPa)

Notes

1. Proportional Band = output range/k
2. Use VRP-SB-PID-125 when 80 psig (552 kPa) < power supply gas < 125 psig (1035 kPa)



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

Repair Kit Number 30-9301



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!



RSM Series Remote Setpoint Module

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

Digital Pulse Input

- 24 V D.C.
- 120 V A.C.

Analog Current Input

- 4-20 mA command signal at 24 V D.C.
- 4-20 mA command signal at 120 V A.C.

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-PID pilot. The pump can provide a false signal pressure of 20%-40% 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.

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 12L 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.

Reference Becker VB Volume Booster sales literature for additional information.

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 specific application needs. All panels come fully assembled, tested, and adjusted per 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. 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 and diaphragm actuator. The system required a valve positioner due to constant cycling of control valve and constant bleed to atmosphere.

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 VRP-SB-PID can improve performance and minimize atmospheric bleed emissions. Becker VRP-SB-PID are compatible for retrofit with the following:

- Fisher Type 1051/1052™ Rotary spring and diaphragm type actuators
- Fisher Type 657/667™ Linear spring and diaphragm type actuators
- Welker Jet® Control Valves
- Other manufacturers' system, consult Becker for assistance
- Most manufacturers' spring and diaphragm or spring and piston style valve actuators



Figure 16.2 - After Retrofit

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

Table 8 - Application Guidelines for Becker Control Instrumentation

	VRP-CH Pilot	VRP-B-CH Pilot	VRP-SB-CH Pilot	VRP-SB-GAP	VRP-SB-PID Pilot	HPP-4 Positioner	HPP-5 Positioner	HPP-SB Positioner	DNGP Positioner	Notes
Applications										
Pressure Control	•	•	•		•	•	•	•	•	1,2
Flow Control						•	•	•	•	2
Power Plant Type Pressure Control	•				•	•		•	•	3
Power Plant Type Flow Control						•		•	•	3
Surge Control						•		•		
On / Off				•						
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 valve.
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 and LPDA Small Models are defined as actuator sizes 14L and smaller ($< 2000 \text{ in}^3 / 0.033\text{m}^3$)
5. RPDA and LPDA Large Models are defined as actuator sizes 12T and larger ($\geq 2000 \text{ in}^3 / 0.033\text{m}^3$)
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 $P_{\text{discharge}} \leq 60 \text{ psig (414 kPa)}$ and/or $P_{\text{supply}} \leq 150 \text{ psig (1034 kPa)}$.
9. PS-2 and DPS-2 Non-Bleed Sensors must be utilized when $P_{\text{discharge}} > 60 \text{ psig (414 kPa)}$ and/or $P_{\text{supply}} > 150 \text{ psig (1034 kPa)}$.
10. VB Series Volume Boosters are necessary for power plant regulation, surge control applications, or when large model RPDA are utilized.

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Figure 17 - 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.

Additional resources are available on our website. Sales literature, sizing software, and technical manuals are available for download at www.dresser.com/becker

