

VPC SERIES VALVE PILOT CONTROLLERS



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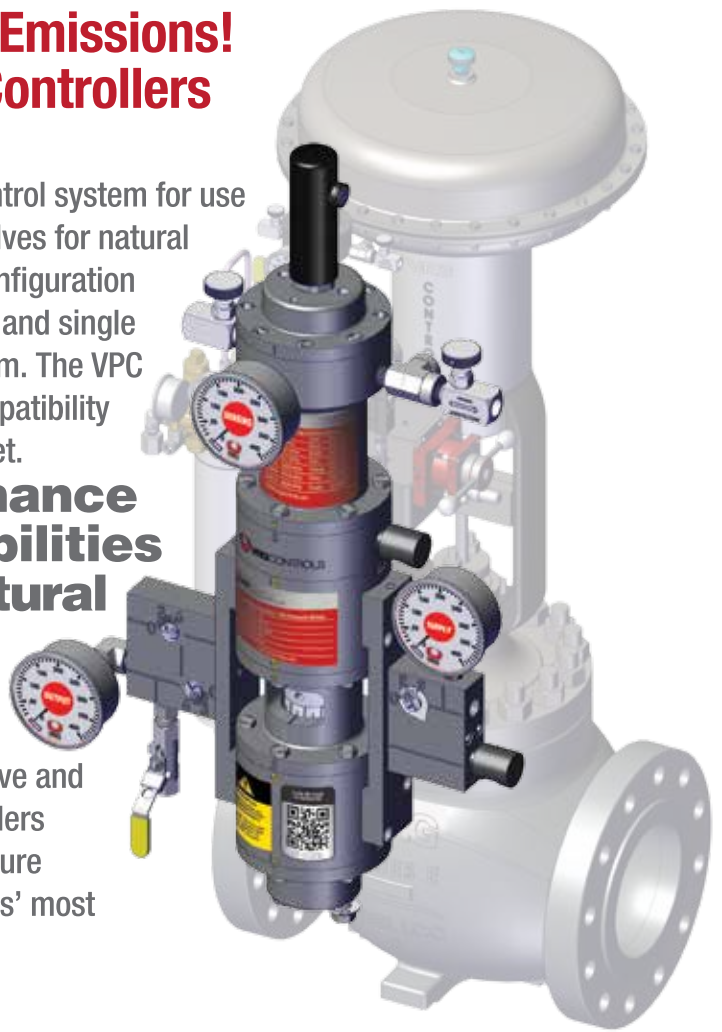
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Plug & Play Flexibility with Zero Emissions! A Revolution in Valve Pressure Controllers for the Natural Gas Industry!

The VPC provides a modular, plug & play pressure control system for use in conjunction with pneumatically actuated control valves for natural gas pipelines. The VPC features a simplified 5-in-1 configuration system that provides compatibility with double acting and single acting (spring return) control valves in a single platform. The VPC may be easily reconfigured in the field to provide compatibility with almost any pneumatic control valve on the market.

The high accuracy performance and ZERO emissions capabilities are ideally suited for the natural gas industry.

The VPC was designed by the inventor of the original "Valve Regulator Pilot" and features patented technological advances that provide reliability, convenience, and performance above and beyond previous technologies. VPC Valve Pilot Controllers represent the future of natural gas control valve pressure control technology and are backed up by the industries' most experienced team.



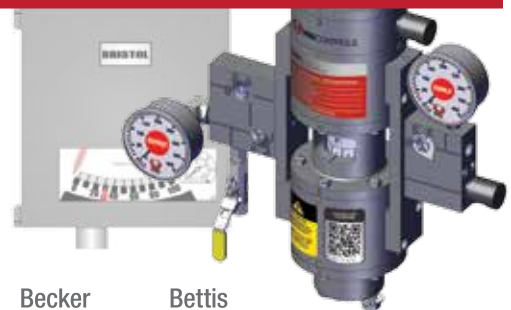
Applications

- PRIMARY PRESSURE CONTROL (ACTIVE)
 - UNDERPRESSURE PROTECTION (STANDBY)
 - TWO-STAGE PRESSURE CONTROL
- OVERPRESSURE PROTECTION (MONITOR)
 - BACKPRESSURE CONTROL
 - SPLIT RANGE PRESSURE CONTROL
- OVERPRESSURE PROTECTION (RELIEF)
 - TANDEM PRESSURE CONTROL
 - POWER PLANT FUEL GAS FEED



VRG Controls are Compatible with Wide Array of Manufacturers:

Contact us to determine how we can improve the performance of your existing or new control valve installations with VRG Controls instrumentation and accessories.



- | | | |
|------------|--------------------|---------------------|
| Becker | Bettis | |
| Bristol | Controls CCI Valve | |
| Fisher | Controls Flowserve | |
| Masoneilan | Mokveld | |
| Pibiviesse | Neles | |
| Valbart | Welker | Other Manufacturers |



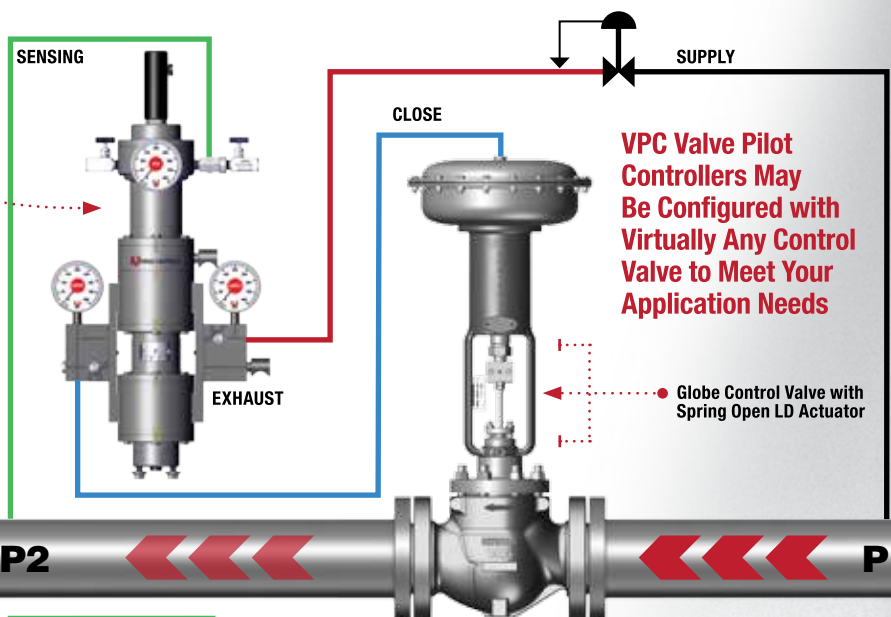
VRG CONTROLS INSTRUMENTATION EXCEEDS EPA RULING EPA-HQ-OAR-2010-0505, REQUIRING "CONSTANT BLEED CONTROLLERS" IN THE OIL AND NATURAL GAS INDUSTRY MUST MEET <6 SCFH BLEED RATE BY OCTOBER 2013.

1

EXAMPLE

VPC-SA-BV Controller Setup as Pressure Control on LD Series Spring Open Actuator.
Globe control valve with spring open control valve actuator equipped with VPC-SA-BV provides pressure control. Exhibits Zero steady state emissions.

VPC-SA-BV



VPC Valve Pilot Controllers May Be Configured with Virtually Any Control Valve to Meet Your Application Needs

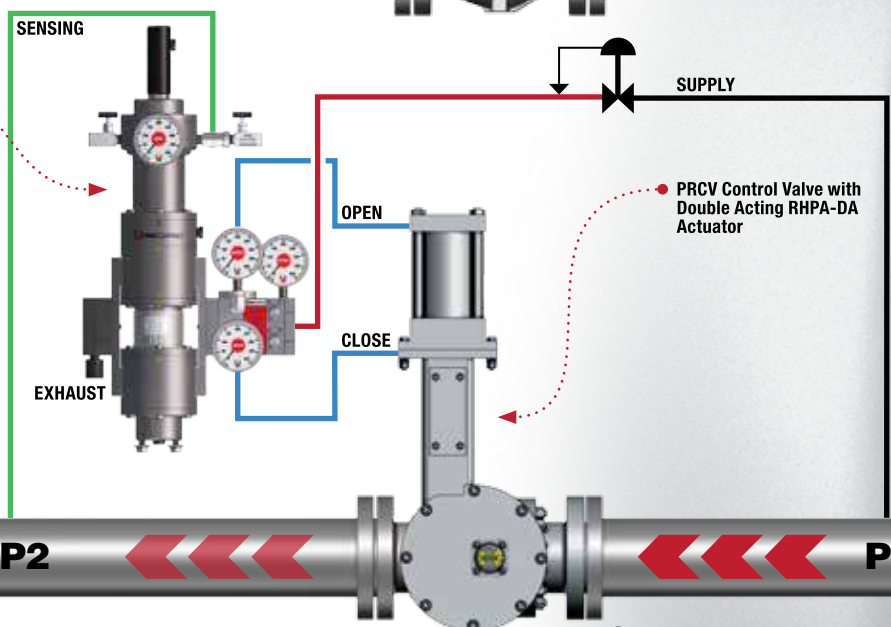
Globe Control Valve with Spring Open LD Actuator

2

EXAMPLE

VPC-DA-BV Controller Setup as Pressure Control on Double Acting Actuator.
RHPA-DA double acting control valve actuator equipped with VPC-DA-BV and NVD provides worker or monitor pressure control. Shown with PRCV Pipeline Rotary Control Valve. Exhibits Zero emissions when control valve full open and full closed. Exhaust may be directed to downstream for elimination of atmospheric emission in certain cases.

VPC-DA-BV w/NVD



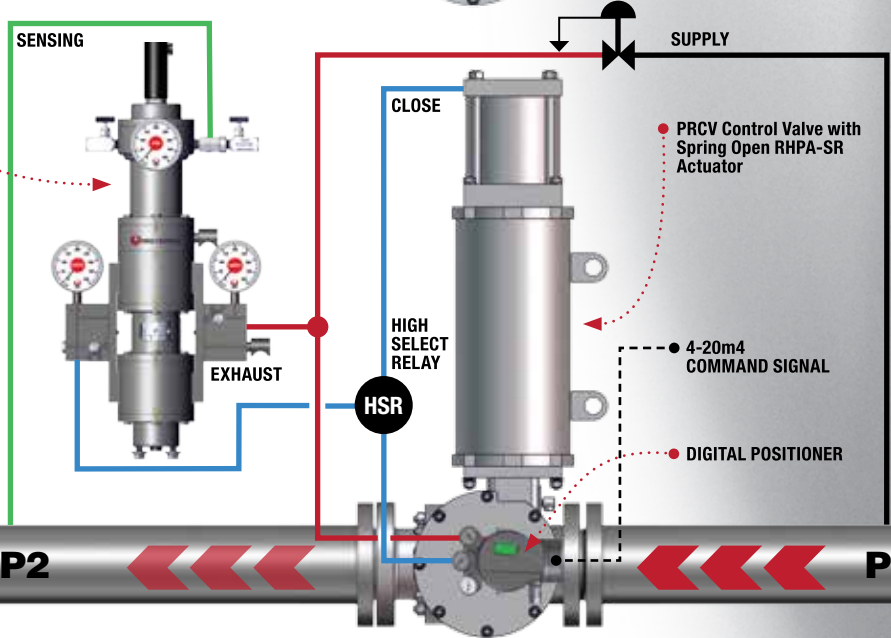
PRCV Control Valve with Double Acting RHPA-DA Actuator

3

EXAMPLE

VPC-SA-BV Controller Setup as Pressure Control Override on Spring Return Actuator.
RHPA-SR Spring Open control valve actuator equipped with electro-pneumatic positioner. VPC-SA-BV provides Pressure Control Override (PCO) in event of positioner failure. System exhibits ZERO steady state emissions from positioner and VPC Controller.

VPC-SA-BV

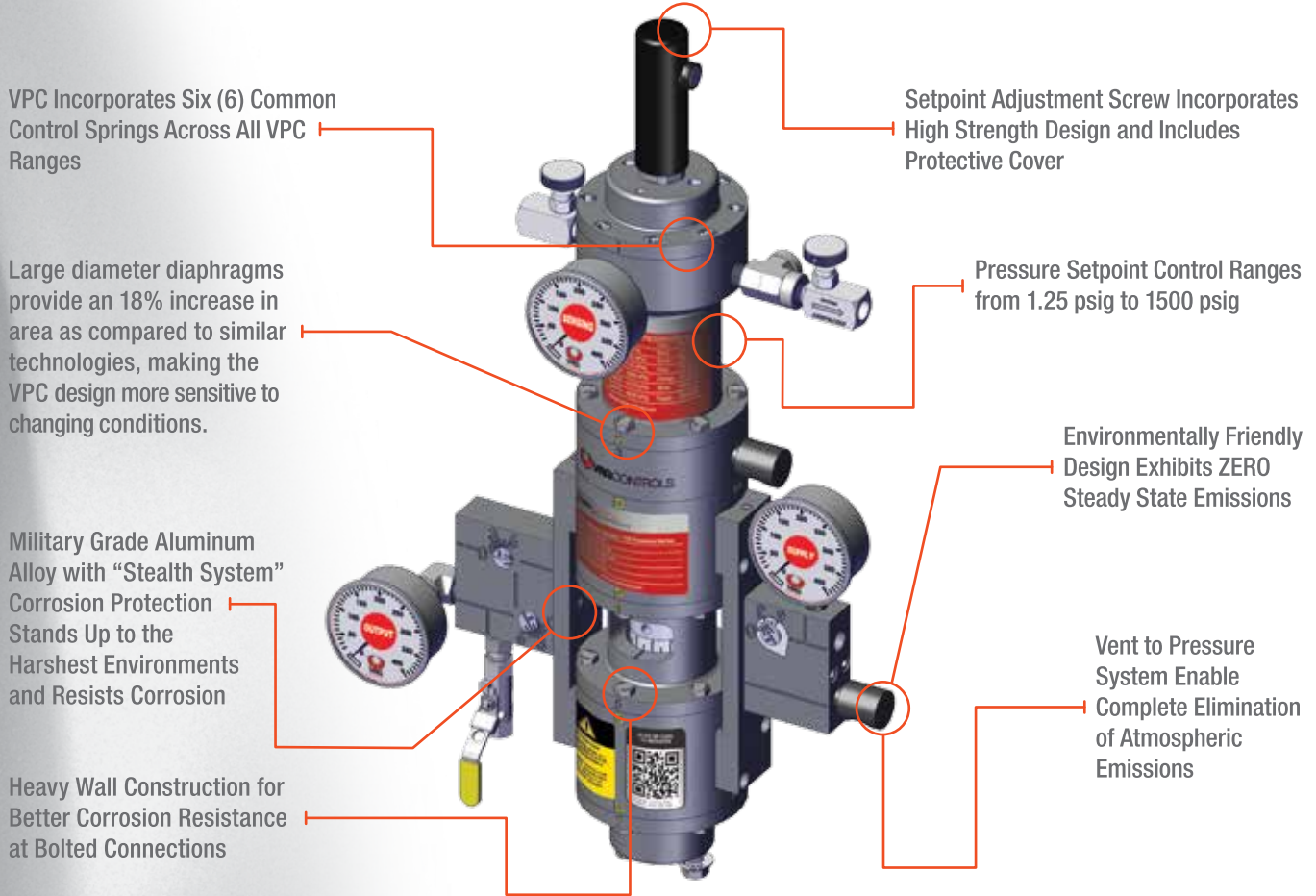


PRCV Control Valve with Spring Open RHPA-SR Actuator

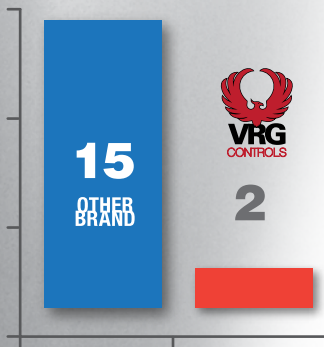
4-20mA COMMAND SIGNAL

DIGITAL POSITIONER

Features & Benefits for The Natural Gas Industry



Stock Fewer Repair Kits with VPC



Number Repair Kits

VPC Controllers are designed from a single platform, significantly reducing parts. The VPC series has only two (2) different repair kits, far fewer than the competition.

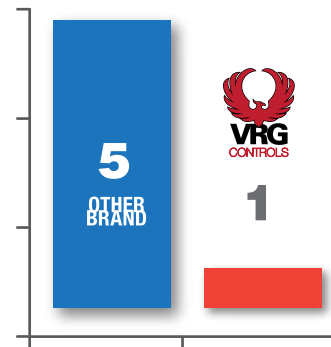
VPC Outlasts The Competition in Corrosive Environments



Salt Spray Duration (Hrs.)

VPC Controllers incorporate Military Grade Aluminum Alloy with "Stealth System" Corrosion Protection to outlast the competitions 3X longer than competitor's standard issue construction.

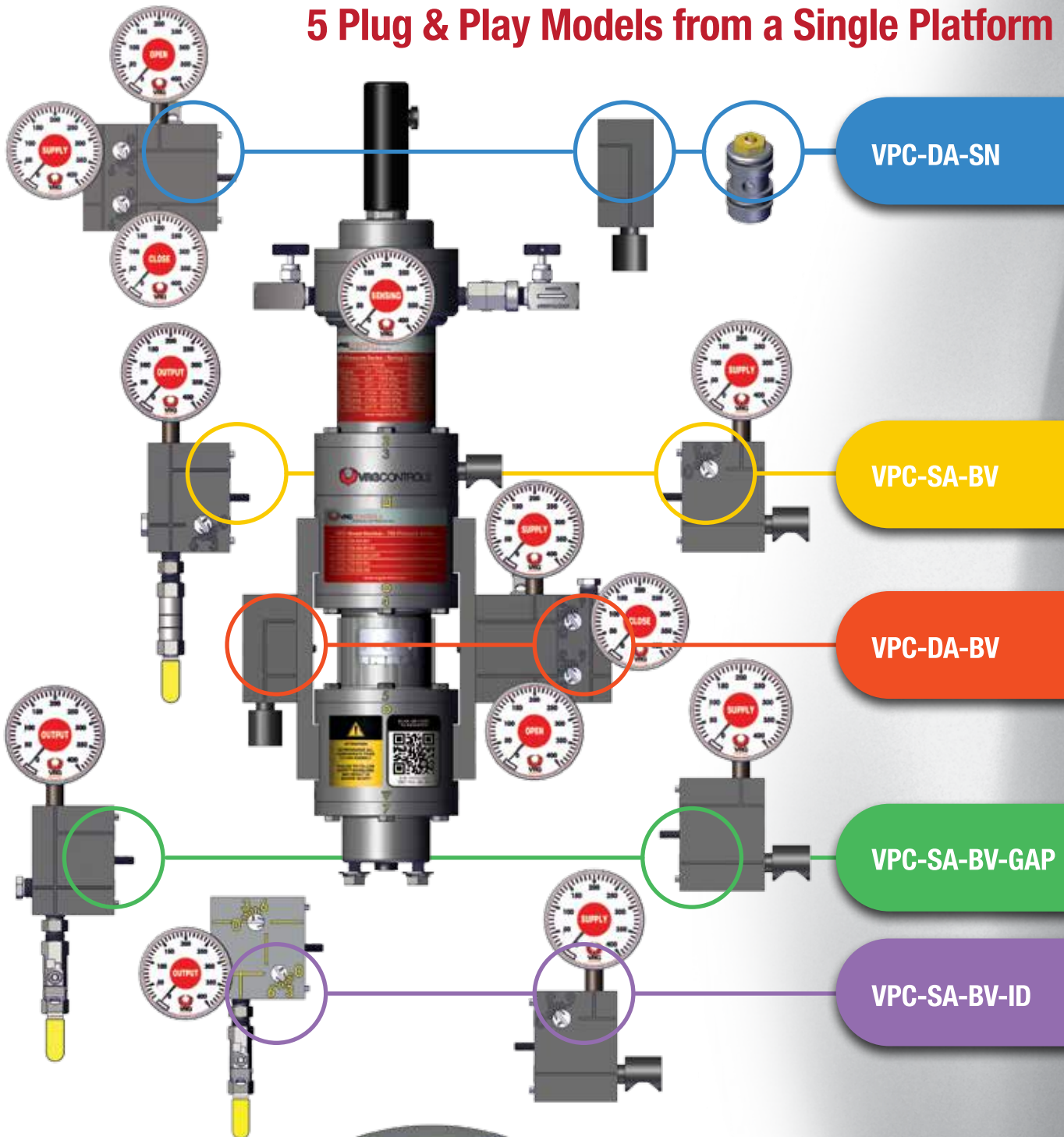
VPV Controls Pressure with Fewer Platforms



Number of Platforms

VPC Controllers plug & play design and high performance materials drastically reduce the number of platforms necessary to provide high performance pressure control.

5 Plug & Play Models from a Single Platform



Logic Xchange Converts from [BV] to [SN] Type

“Logic Xchange” Feature Enables Usage of NC Balanced Valves or NO Seat & Nozzle Internal Porting. VPC’s may be converted in the field from one platform to another to limit the number of spare controllers maintained in your stock.

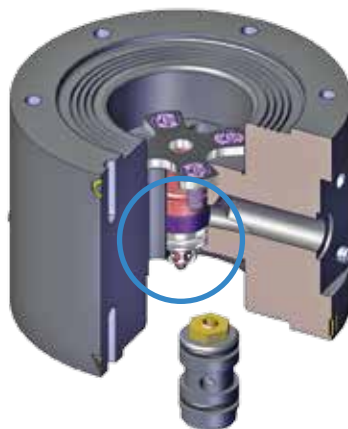
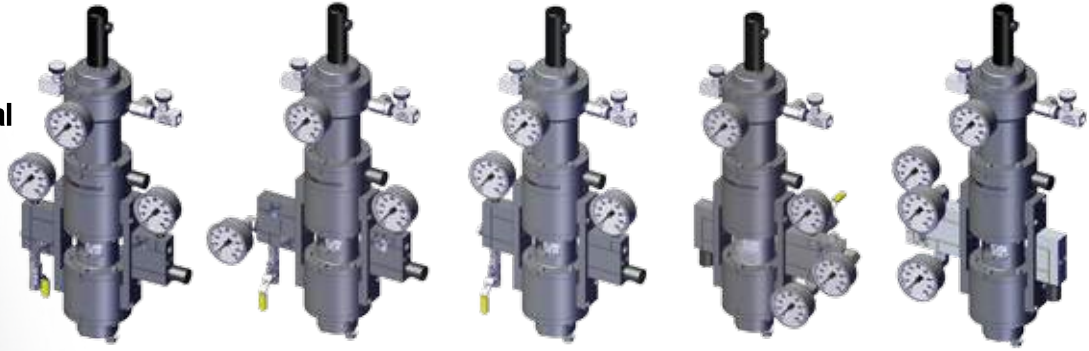


TABLE 1.0
VPC Valve Pilot
Controller Technical
Specifications



VPC MODEL	VPC-SA-BV	VPC-SA-BV-ID	VPC SA-BV-GAP	VPC DA-BV	VPC DA-SN
Type	Variable	Variable	Discrete (ON-OFF)	Variable	Variable
Outputs	Single Acting (1)			Double Acting (2)	
Internal Valve Logic	NC Balanced Valve ¹	NC Balanced Valve ¹	NC Balanced Valve ¹	NC Balanced Valve ¹	NO Seat & Nozzle ¹
Setpoint Range	3.0 - 1500 psig (21-10, 342 kPa)				
Temperature Range	-20°F to +160°F (-29°C to +71°C)				
CONSUMPTION					
Steady State Control	ZERO ²			<10 scfh ³	≈50 scfh ³
Full Open	ZERO			ZERO ⁴	
Full Closed	ZERO			ZERO ⁴	
ZERO Emissions	Atmospheric Emissions May Be Achieved When "Vent to Pressure System" Feature Utilized				
EPA Specifications	Exceeds EPA Ruling, EPA-HQ-OAR-2010-0505, requiring <6 SCFH bleed rate by October 2013.				
PNEUMATIC					
Supply Gas Quality	Dry, Filtered @ 10μ Natural Gas or Air				
Max Supply Gas Pressure	400 psig (2758 kPa)				
Min Supply Gas Pressure	20 psig				
Max Discharge ΔP	150 psig (1034 kPa)				
Min Discharge ΔP	20 psig (138 kPa)				
Connections	All Ports ¼ FNPT				
CONSTRUCTION					
External Parts	VRG Military Grade Alloy with "Stealth" Corrosion Protection (304SS Optional)316 SS				
Internal Parts	316 SS				
Diaphragms	Nylon Reinforced Buna-N				
O-Rings	Buna-N				
Control Springs	Painted Alloy Steel				
Gauges	2.5 in. Liquid-Filled SS Case & Body				
Weight	20 lbs. (9.0 kg)				
Approx. Dimensions	22 in 12 in X 7 in (559 mm X 305 mm X 178 mm)				
COMPLETE ACTUATORS AND CONTROL VALVES					
SA Spring & Diaphragm Act.	●	●	●		
SA Spring & Piston Act.	●	●	●		
Double Acting DOT ⁵ Piston Act.		● ⁵	● ⁵	●	●
"Jet" Regulator	●	●	●		
Pneumatic Positioner		●			
Volume Booster		●			●

NOTES:

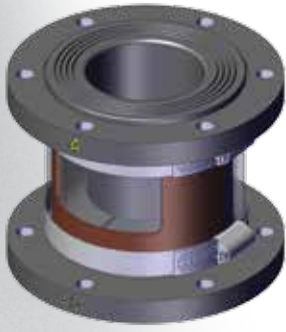
1. NC Balanced Valves and NO Seat & Nozzle internal components may be exchange/converted to meet application requirements
2. ZERO Steady State emissions achieved when VPC properly adjusted to exhibit factory advised deadband setting
3. Consumption is approximate and based upon 100 psig Supply Gas. Atmosphere emissions may be completely eliminated when Discharge to Pressure System incorporated.
4. Double acting VPC's require addition of No-Vent Device to achieve ZERO emissions at full open and full closed
5. Double Acting Piston Actuators Equipped with Single Acting VPC requires additional interface instrumentation such as pneumatic positioner or pilot-operated trigger valve (GAP)

TABLE 2.0
VPC Controller Spring Ranges and Performance Specifications

VPC SERIES	CONTROL RANGE	SPRING COLOR	SETPOINT CHANGE PER TURN	SETPOINT ACCURACY ¹	MAX GAP SETPOINT RANGE ²	CONTROL SPRING PART NUMBER
VPC-225 SERIES	3.0-15 psig (21 - 103 kPa)	Black	0.8 psig (5.5 kPa)	±0.1 psig (±0.7 kPa)	0.1 – 0.6 psig (0.7 – 4 kPa)	CS-0100
	5 - 53 psig (55 - 365 kPa)	Brown	3.1 psig (21.4 kPa)	±0.1 psig (±0.7 kPa)	0.2 – 2.3 psig (1.4 – 15.9 kPa)	CS-0110
	16 - 100 psig (110 - 689 kPa)	Grey	8 psig (55 kPa)	±0.2 psig (1.0 kPa)	0.5 - 6 psig (3.4 - 41 kPa)	CS-0120
	40 - 170 psig (276 - 1172 kPa)	Orange	20.2 psig (139 kPa)	±0.4 psig (±2.6 kPa)	1 – 15 psig (6.9 - 103 kPa)	CS-0130
	65 - 205 psig (448 - 1413 kPa)	White	32.2 psig (222 kPa)	±0.6 psig (±4.2 kPa)	2 - 24 psig (14 - 165 kPa)	CS-0135
	100 - 225 psig (689 - 1551 kPa)	Purple	44.2 psig (305 kPa)	±0.8 psig (±5.6 kPa)	3 - 34 psig (21 - 234 kPa)	CS-0140
VPC-700 SERIES	9 - 45 psig (62 - 310 kPa)	Black	2.4 psig (17 kPa)	±0.5 psig (±3.4 kPa)	0.5 – 1.9 psig (3.4 – 14 kPa)	CS-0100
	30 - 160 psig (241 - 1103 kPa)	Brown	9.6 psig (73 kPa)	±0.7 psig (±4.5 kPa)	1.5 - 8 psig (10 - 55 kPa)	CS-0110
	75 - 310 psig (517 - 2137 kPa)	Grey	24.5 psig (175 kPa)	±1.6 psig (±10 kPa)	3 - 20 psig (21 - 137 kPa)	CS-0120
	150 - 520 psig (1034 - 3585 kPa)	Orange	62.1 psig (423 kPa)	±3.8 psig (±26 kPa)	5 - 49 psig (35 - 337 kPa)	CS-0130
	240 - 635 psig (1655 - 4378 kPa)	White	98.9 psig (687 kPa)	±6.2 psig (±43 kPa)	6 - 80 psig (41 - 552 kPa)	CS-0135
	350 - 700 psig (2413 - 4826 kPa)	Purple	135.9 psig (926 kPa)	±8.3 psig (±57 kPa)	8 - 107 psig (69 - 276 kPa)	CS-0140
VPC-1500 SERIES	30 - 90 psig (207 - 620 kPa)	Black	5.0 psig (34 kPa)	±5.0 psig (±34 kPa)	N/A ³	CS-0100
	50 - 335 psig (345 - 2309 kPa)	Brown	19.7 psig (149 kPa)	±5.0 psig (±34 kPa)	N/A ³	CS-0110
	100 - 640 psig (689 - 4412 kPa)	Grey	50.4 psig (361 kPa)	±5.0 psig (±34 kPa)	10 - 40 psig (69 - 276 kPa)	CS-0120
	265 - 1070 psig (1827 - 7377 kPa)	Orange	127.6 psig (870 kPa)	±7.8 psig (±54 kPa)	10 - 100 psig (69 - 690 kPa)	CS-0130
	400 - 1300 psig (2758 - 8962 kPa)	White	203.2 psig (870 kPa)	±13 psig (±88 kPa)	15 - 163 psig (103 - 1125 kPa)	CS-0135
	625 - 1500 psig (4309 - 10341 kPa)	Purple	279.3 psig (1904 kPa)	±17 psig (±118 kPa)	20 - 220 psig (138 - 1522 kPa)	CS-0140

NOTES:

1. Setpoint Accuracy based upon proper maintenance of VPC Controller and adjustment to specification following VPC Controller Technical Manual. Standard VPC Setpoint Accuracy is reported in this table. Setpoint Accuracy may be multiplied by 0.5X (improved) by incorporating a valve positioner or volume booster.
2. Maximum "GAP" Setpoint Range applicable only to VPC-GAP Controller Configurations. The "GAP" relates to bracketed high-low trigger points for discrete on-off control logic.
3. Control Spring and VPC Series Combination not recommended for GAP control applications.



SUB SUBMERSIBLE OPTION

VRG Control Instrumentation may be equipped with SUB Submersible Option to allow for installation in vaults and other installations that frequently fill with water. The Submersible Option ensures continual operation of control devices even when submerged.

- Applicable for ALL VRG models of VPC Valve Pilot Controllers
- Sealing system encapsulates VPC adjustment drum to prevent water intrusion
- Vent elbow ports are configured with sealed fittings to prevent water intrusion

Compatible with All VRG VPC Valve Pilot Controllers



NVD No Vent Device

Double Acting VPC Valve Pilot Controllers and VGP Valve Gas Positioners continue to discharge gas when the control valve is at full open or full closed positions. The NVD No Vent Device shuts off VPC & VGP discharge when control valves are at full open and full closed positions.

- Eliminate discharge gas at full open and full closed valve positions
- Automatic Activation and Reset
- Greater sensitivity than competitor's products
- Manifold design easily installed
- No adjustment necessary

Stainless Steel Construction

- NVD-100 (100 PSIG ≤ PSUPPLY < 125 PSIG)
- NVD-150 (135 PSIG < PSUPPLY < 150 PSIG)
- NVD-80 (80 PSIG < PSUPPLY < 100 PSIG)



VPC BRACKET MOUNTING SYSTEMS

VPC Valve Pilot Controllers may be paired with a VPC Bracket Mounting System for convenient installation on new and retrofit applications. The VPC Bracket includes all stainless steel hardware for 2.0 in pipe mount or flat surface installation.

- Rugged coated carbon steel bracket construction with stainless steel hardware
- Includes 2.0 in post mount hardware (stainless steel)
- May be installed on 2.0 pipe mount or flat surface
- Compatible with Becker VRP Valve Pilot Controllers

Custom designed mounting brackets available specific to your application

- MNTSTD – Standard Mounting Bracket
- MNTUNV – Universal Mounting Bracket (Accepts VMO and SGS)



ESC ELECTRONIC SETPOINT CONTROL

VRG VPC Valve Pilot Controllers and RP Regulator Pilots may be configured for remote setpoint control via electronic signal with the addition of an ESC Electronic Setpoint Control system. Pressure control setpoint may be raised/lowered remotely by an RTU or Gas Control.



VPC-SA-BV-REG REMOTE SET REGULATOR

The VPC-SA-BV-REG or "VPC-REG" is a zero steady state emissions, precision remote set regulator. The "VPC-REG" provides a pneumatic output to drive pneumatic positioners or single acting control valve actuators via a proportional pneumatic output. The "VPC-REG" is available in a variety of input signals and output pressure ranges.



CP1500 CALIBRATION PUMP

CP-1500 Calibration Pump provides ability to raise/lower trapped sensing pressure to facilitate calibration of pneumatic instruments. The CP1500 does not require any outside power source and works by compressing trapped pressure. The fine adjustment capability ensures precise pressure loading of control devices for calibration and testing purposes.

VPC OPTIONS AND ACCESSORIES

DESCRIPTION

FEATURES

EXTRAS AND OPTIONS

MODELS

- Secure Interface Module with Manual Adjustment Override
- Rated for installation in natural gas applications (Explosion Proof, Class 1, Div.1)
- Digital Pulse or Analog Command Signal control input options
- Failsafe configuration options to lock last or max/min on loss of signal
- Compatible with VRG VPC's and RP's
- Compatible with Becker VRP's/FEP's and Mooney Series 20 Pilots

- Designed for High Cycle Duty, Repeatability, and Accuracy
- High Performance Replacement for Bristol 9110 / Fairchild or other Remote Setpoint Regulators
- ZERO Emissions at Steady State
- Rated or Installations in Natural Gas applications (Explosion Proof Class 1, Div. 1)
- Analog or Digital Input Signal Options
- Compatible with VGP Valve Gas Positioners, Other Manufacturers' Pneumatic Positioners, VRG RHPA-SR / LD / RD / LHPA-SR Actuators, Other Manufacturers' Positioners

- Maximum Pressure – 1500 PSIG
- ¼ NPT Port allows technicians to build custom test rigs
- Compatible with all VRG control instrumentation
- Multiple units may be installed in parallel for greater compression
- No outside pressure source required to operate

MNTESC - Mounting Bracket for ESC Module w/ Mooney-20L/20S

Configured for Mooney Series 20/20S/20L Pilots
Configured for Becker FEP's and VRP's
Locking Option for Secure Interface Module

Input Signal Options: 4-20 mA Analog, 24 VDC/110 VAC Discrete

Output Signal Ranges: 3-15 psig, 6-30 psig, Any Range Up to 150 psig Maximum Output
Reverse Acting or Direct Acting Configurations

Custom configurations with gages, fittings and valves

Multiple unit configurations for greater compression

ESCSM1140 – Discrete Pulse Signal (± 24 VDC/110 VAC)

ESCSM1000 – Analog/Discrete Pulse Signal (4-20 mA or ± 24 VDC)

VPC-225-SA-BV-REG

CP1500

**VB VOLUME BOOSTERS**

VB Volume Boosters provide high capacity output when paired with VPC Controllers and VGP Valve Gas Positioners. Volume Boosters may be utilized in conjunction with double acting and single acting devices to provide accelerated speed in open and closing directions. The Volume Booster is typically a necessary accessory with large bore control valves where high volume displacement actuators are incorporated.

- Max Supply Pressure 150 PSIG
- Compatible with all VPC's and VGP's
- Provides high capacity for quick response
- NPT tapped exhaust port standard
- Adjustable bypass equipped for tuning
- 1:1 Pressure Loading/Output Ratio

4514AEL – Volume Booster (Loose)

4514AEI – Volume Booster (Includes Fittings)

**90 / 91 PRESSURE SELECTOR RELAY**

Model 90/91 Pressure Selector Relay is designed to select the lower/higher of two signal pressures to provide a continuous output pressure to a control device. Pressure Selector Relays are ideal companion to VPC Valve Pilot Controllers to provide an override function.

- Compact, lightweight design
- No adjustment necessary
- Commonly used for Pressure Control Override (PCO)
- Bump-less transition between signal selection

Model 90 – Low Select Relay

Model 91 – High Select Relay

**SGS SUPPLY GAS SYSTEMS**

SGS Supply Gas Systems provide a convenient, pre-packaged system for instrumentation supply gas. The SGS System is a cost-effective solution to ensure receipt of pre-packaged supply gas system guaranteed to work "out of the box." SGS Systems may be configured with a multitude of instrumentation and equipment to suit your application.

- Secure enclosures available with locking
- Surface mount model easily bolted to walls or structures
- Pre-packaged design customized to your application
- Compatible with virtually any control system

Supply Gas Regulators
Filter Dryer Replacement Cartridges
BRASS Regulator Construction
STAINLESS STEEL Regulator Construction
POST, PANEL and CABINET Configurations

SG1-F-HP1

SG1-F-HP1-LP1

SG1-FD5-HP1-BP

SG1-FD5-HP1-LP1-BP

SG2-FD5-HP2-BP

SG2-FD5-HP2-LP1-BP



Improve Control Accuracy at Power Plants

Existing Fisher globe control valves were retrofitted to replace Type 4195 pressure controllers at Florida power plant. VPC's improved control accuracy from ± 7 PSIG to better than ± 1.0 PSIG and simplified adjustment.



Improved Design Over "PID" Pilot Type Controllers

A Texas power plant replaced VRP "PID" Type due to corrosion issues. VPC design provided corrosion resistance, simplified adjustment and greatly improved control accuracy and speed of response.



Complete Control Valve Package from VRG

The VRG RHPA actuator, PRCV control valve and VPC-DA-BV Valve Pilot Controller provides a complete solution for high capacity natural gas regulation.



Compatible with Other Manufacturers Control Valves

A VPC-SA-BV is shown installed on a Fisher ET Style control valve. VPC's can provide optimum performance and eliminate emissions on existing and new installations.

"VRG Controls Has Solutions for Your Demanding Applications"



VRG Resists Corrosion

Florida based gas pipeline replaced existing Type 624 controllers, 3570 positioners and MCV devices with VRG components. VRG designs feature much greater corrosion resistance in marine environments without a premium price.



Remote Control Options Available

CABINET mounted VPC Valve Pilot controllers are shown with ESC "remote setpoint control" via a 4-20 mA command signal. This gas utility experienced trouble free operation through harsh Minnesota winter without application of instrument heat.



New Generation of Pilot Type Control

Gas Pipeline customer replaced existing Becker pilot controllers with VRG's Valve Pilot Control System. The retrofit was simple and easy with improved corrosion resistance. The VPC's improved sensitivity ensures monitors remain non-venting even when pipeline operating pressure is pushed to the max.



Bristol 9110 Replacement

A VPC-SA-BV-REG (middle) provides 6-30 psig output proportional to a 4-20 mA input signal. The "VPC-REG" unit is a lock last I/P that can replace obsolete Bristol 9110 units.



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