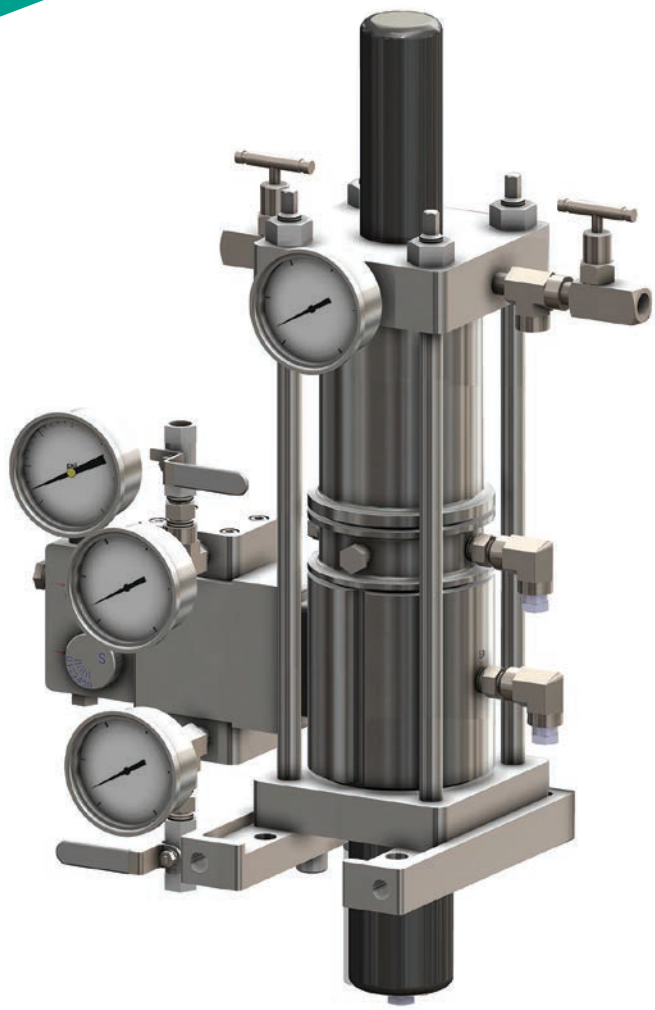
Technical Specifications
Rev. A - 04/2025

Becker™ VRP Series Valve Regulator Pilots 3rd Generation

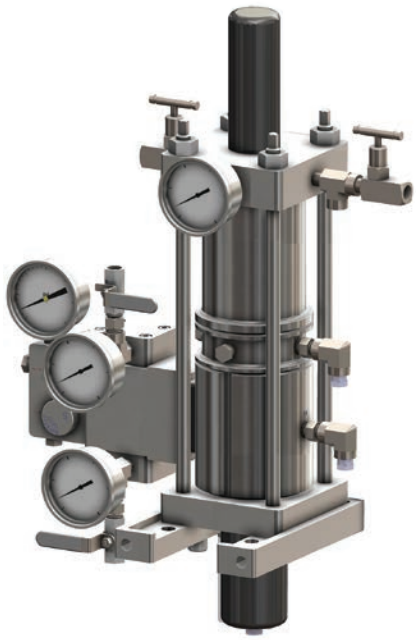
VRP Series pilot can improve performance and minimize bleed gas emissions



Baker Hughes

The **Becker™ VRP Pilot** provides pressure control when utilized with a pneumatically actuated control valve. The VRP pilot measures process sensing pressure and positions the actuator to maintain the pressure setpoint. The VRP pilot may be utilized for pressure control applications with setpoints ranging from 1.0 psig (6.9 kPa) to 1500 psig (10342 kPa). When properly configured, VRP pilots feature ZERO steady state bleed and may incorporate Becker's unique **Bleed to Pressure System (BPS)** capability to completely eliminate atmospheric emissions.

Features



- Simple cost effective pneumatic control
- Pressure setpoints from 1.0 psig (6.9 kPa) to 1500 psig (10342 kPa)
- Setpoint accuracy of ±0.75% of setpoint
- ZERO steady state bleed emissions eliminate atmospheric emissions
- Bleed to Pressure System (BPS) eliminates all emissions by maintaining all gas within the piping system
- Compatible with most manufacturers' control valves
- Quick and easy retrofit replaces high bleed pneumatic controllers and positioners
- Design specifically suited for natural gas pipelines and distribution systems
- Rugged design is vibration resistant and suitable for demanding pipeline applications
- Easy, intuitive adjustment and maintenance techniques greatly minimize training

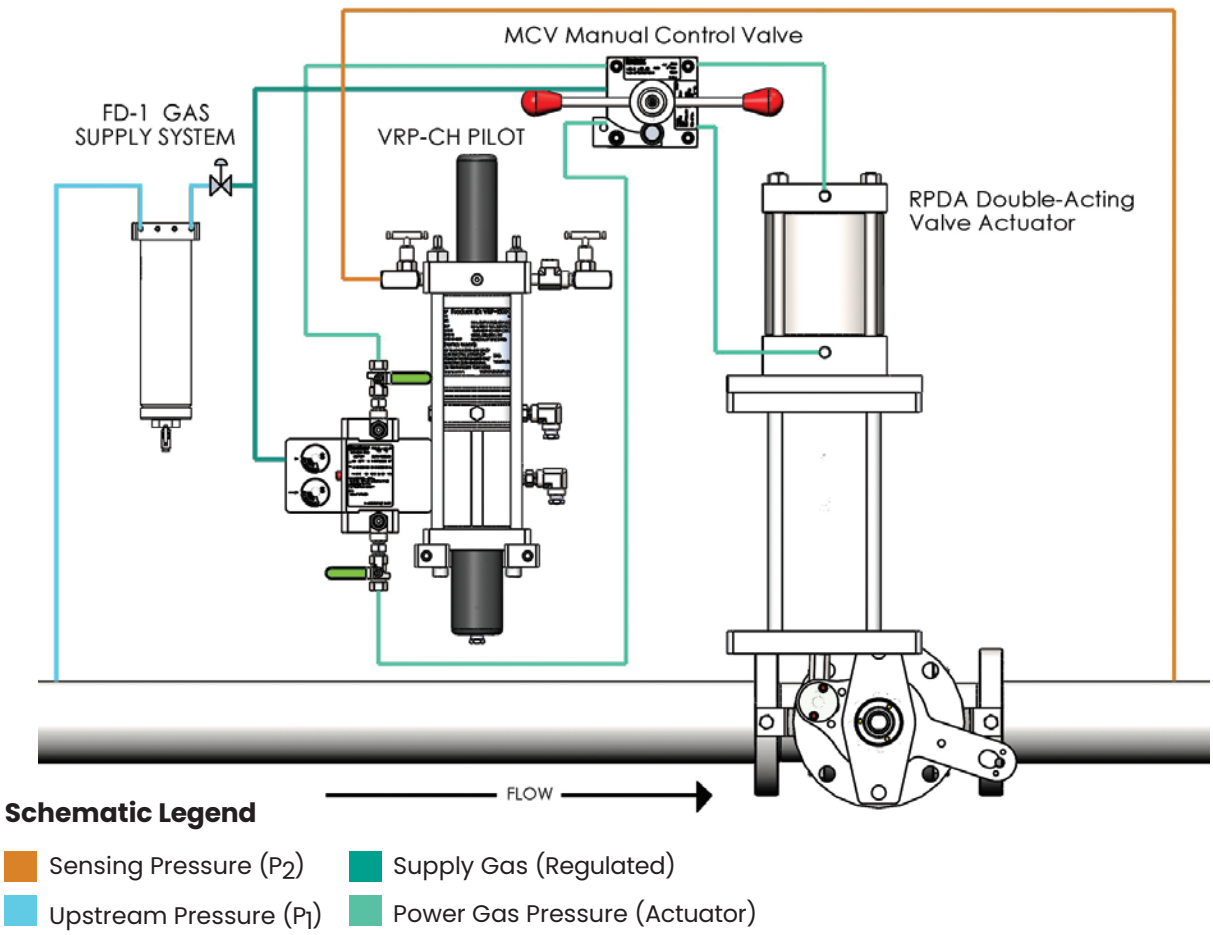


Figure 1 - Principle of Operation

Improve Performance and Minimize Bleed Gas Emissions

Optimum performance is achieved by pairing the VRP pilot with genuine Becker control valve actuators. If you already have existing control valve actuators in service, the addition of a VRP pilot can improve performance and minimize bleed gas emissions. Becker VRP pilots are compatible for retrofit with most manufacturers' actuators.
Consult Baker Hughes for more information.

Table 1 - VRP Port Definitions

VRP Adjustments	Port Size	Item
Sensing (input)	1/4" FNPT	A
Power gas supply (input)		B
Loading - pressure to close valve		D
Loading - pressure to open valve		E
Breather vents		F

Table 2 - VRP Adjustments

VRP Adjustments	Item
Setpoint elevation adjustment	1
Deadband (sensitivity)	2
Loading adjustable orifice (valve closure)	3
Loading adjustable orifice (valve opening)	4

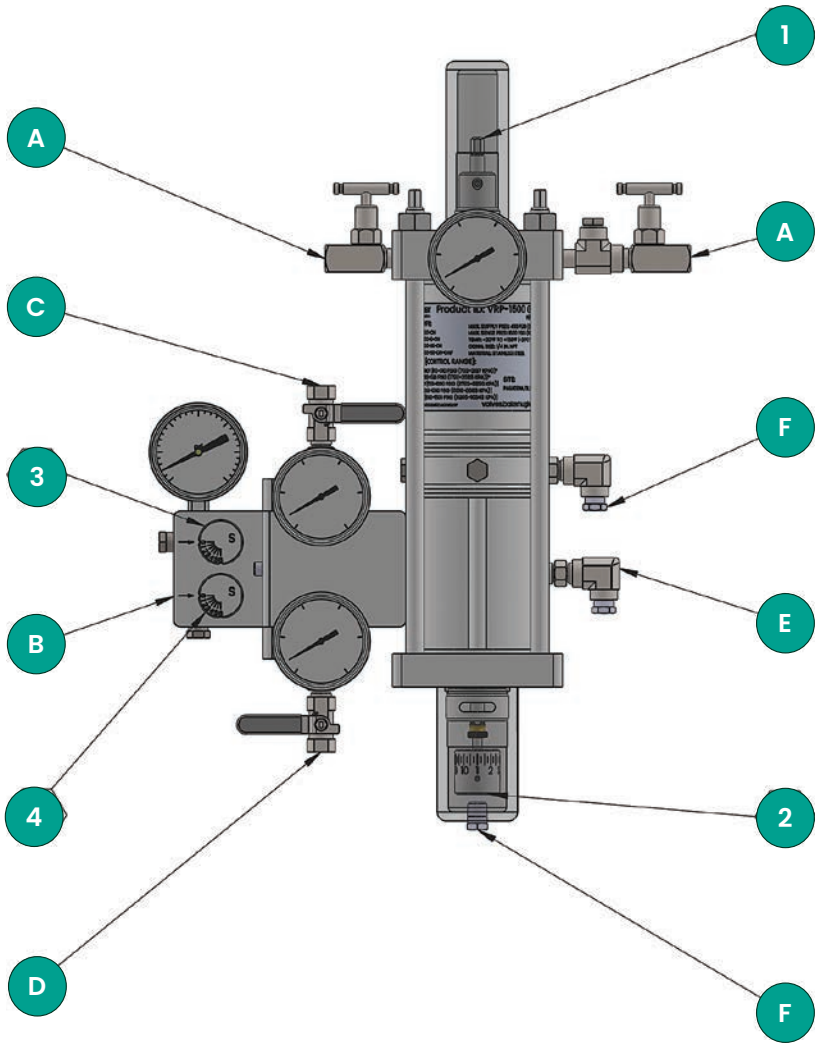


Figure 2 - Model VRP-1500-CH Pressure Control System.

VRP pilots are specifically designed for use in natural gas pressure regulation and provides a simple, economical alternative to the controller and positioner combination.

How it Works

(Downstream Pressure Control)

The VRP-CH configuration shown is double-acting. The energy to operate the control valve is obtained from the differential between supply gas pressure and discharge gas pressure. When the measured variable, downstream pressure, falls below the pilot set point, the pilot pressurizes the top of the double-acting cylinder and moves the valve toward the open position (Figure 3.1). When downstream pressure reaches or exceeds the pilot set point, the pilot pressurizes the bottom of the cylinder and moves the valve toward the closed position (Figure 3.2). When equipped with a recommended No-Bleed Valve (NBV), the pilot blocks all exhaust gas when the valve is in either the fully closed or fully open position (Figure 3.3). Bleed gas exhausted while the actuator is in motion may be vented to the atmosphere, or captured using the ¼" NPT exhaust port on the pilot for appropriate use or disposal, or to be reinjected into the downstream line using a Becker Bleed to Pressure System when conditions are suitable.

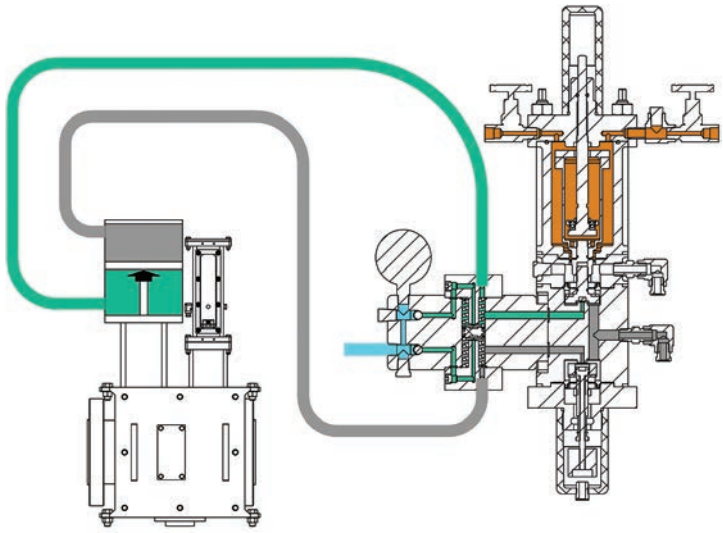


Figure 3.2 - Downstream pressure climbs above set point

When the measured variable rises above the set point, the pilot pressurizes the bottom of the cylinder (light green) and the control valve moves toward the closed position.

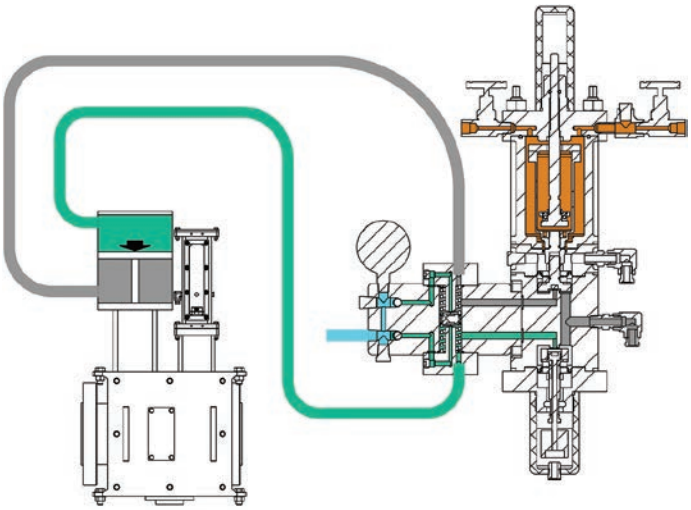


Figure 3.1 - Downstream pressure falls below set point

When the measured variable falls below the set point, the pilot pressurizes the top of the cylinder (light green), and the control valve moves toward the open position.

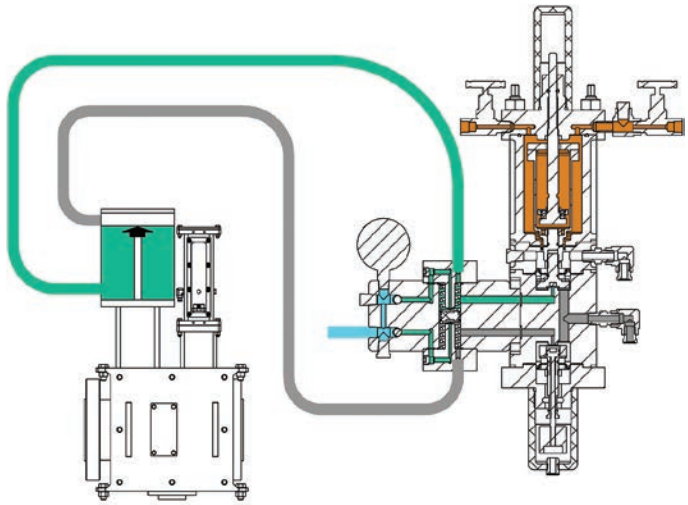


Figure 3.3 - Valve fully closed (or fully open)

When the valve is fully closed or fully open, the No-Bleed Valve (NBV), when equipped, prevents loading gas from exhausting to the atmosphere and generating ZERO bleed.

Schematic Legend

- Atmospheric Pressure
- High Pressure Gas
- Cylinder Loading Pressure
- Measured Variable (downstream pressure)

Table 3 - Technical Specifications for VRP Pilot

Technical Specifications	
Steady State Gas Consumption	ZERO (see Table 4)
Supply Gas	Dry, filtered (100µ) air or gas
Maximum Flow Capacity	2400 scfh (40 scmh)
Maximum Supply Pressure	400 psig (2758 kPa)
Maximum Supply-Discharge Differential	150 psig (1034 kPa)
Minimum Supply-Discharge Differential	20 psig (138 kPa)
Operative Ambient Temperature Range	-20°F to +160°F (-29°C to +71°C)
Approximate Weight	12 lbs (5.4 kg)
Minimum Deadband	0.2% instrumental signal
Independent Linearity	±1.0% of positional range
Control Accuracy	±0.75% of setpoint
Maximum Sensing Pressure	
VRP-600	600 psig (4136 kPa)
VRP-1000/1500	1500 psig (10342 kPa)
Setpoint Range	1.0 psig - 1500 psig (6.9 kPa - 10342 kPa)
Housing	Meets NEMA 3 Classification
Installation Orientation	Vertical position recommended. Custom bracket supplied with Becker Actuators. 2" pipe mount available for retrofit to other manufacturers' actuators.
Materials of Construction	
External Parts	316 SS available
Internal Parts	316 SS
Springs	Alloy steel
Diaphragms	NBR reinforced by nylon fabric
Seats and O-rings	NBR
Tubing and Tubing Fittings	316 SS
Gauges	2 1/2" dial liquid filled with stainless steel case (standard issue with units of psig dual units of psig/kPa available)

Table 4 - VRP-CH Pilot Selection Chart

Model Number	Control Range (psig/kPa)	Spring Color	Part Number
VRP-600-CH	50 – 175 psig (345 – 1207 kPa)	Burgundy	25-8239
	135 – 300 psig (931 – 2069 kPa)	Pink	25-8240
	275 – 600 psig (1896 – 4137 kPa)	Yellow	25-1306
VRP-1500-CH	800 – 1300 psig (5516 – 8964 kPa)	Gray	25-1562
	1000-1500 psig (6895-10342 kPa)	Violet	25-8073

Dimensions

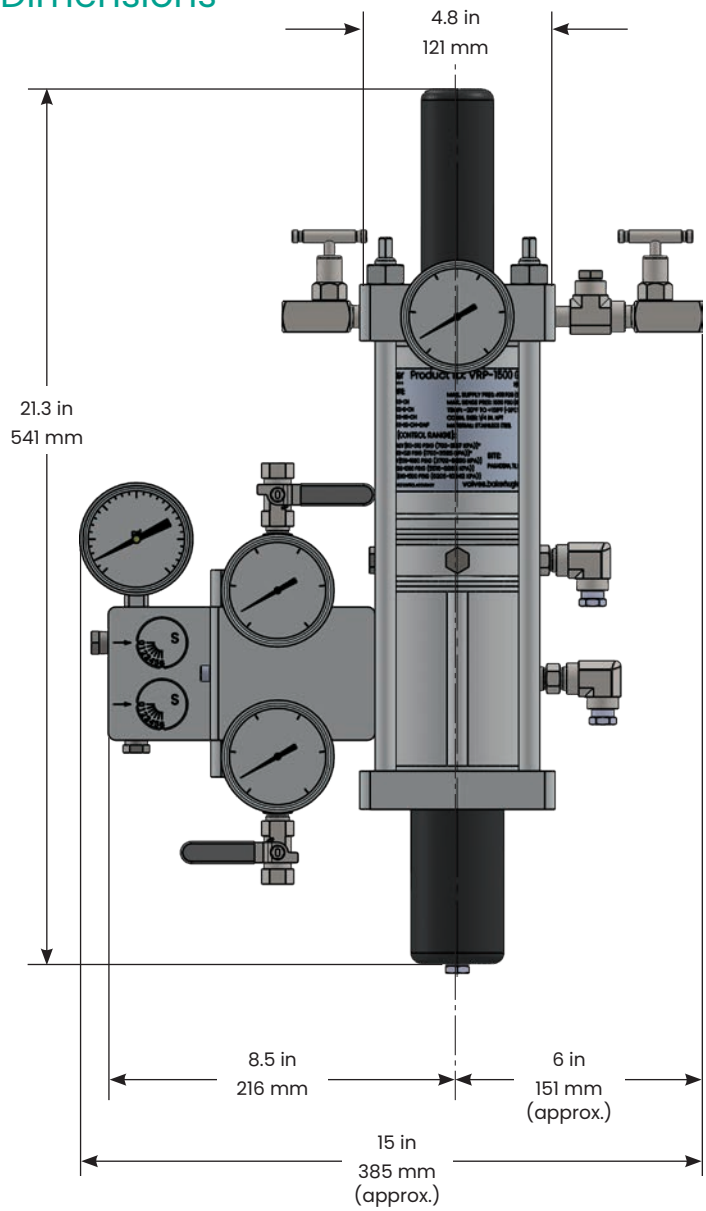


Figure 4 - Model VRP-1500-SB-CH Pilot Control System (Direct-Acting)

Ordering Configuration

1st	2nd	3rd	4th		5th	6th	7th	8th		9th	10th	11th	12th
-	-	D	-	-	-	-	-	-	-	X	-	X	-

Pilot Model	
A	VRP-CH
I	VRP-B-CH
J	VRP-SB-CH
K	VRP-SB-CH-GAP

Chamber Rating	
6	600 psig (41.3 barg)
5	1500 psig (103 barg)

Materials	
D	SS Body and Pneumatics

NBV	
X	None
2	NBV-70
3	NBV-100
4	NBV-150

Spring Color	
D	Gold
B	Beige
U	Burgundy
P	Pink
Y	Yellow
G	Gray
V	Violet
E	Green
S	Silver
L	Blue
R	Red
N	Orange
K	Black
M	Purple
W	White

Orifice	
X	None
D	Standard
M	Medium
L	Large

Supply Gauge	
X	None
L	2000
K	1000
6	600
3	300
2	200
1	100
B	60
A	30

Sensing Gauge	
X	None
L	2000
K	1000
6	600
3	300
2	200
1	100
B	60
A	30

PID Supply, Gain and Nozzle (2)	
X	None

Tank and Booster	
X	None
P	Volume booster
C	Two volume boosters
T	Volume booster and tank

Motor, Remote and Loading (2)	
X	None

Mounting (1)	
X	None
A	Standard mount
B	Pipe mount
C	Wall mount
D	Legacy mount

1. Select Standard Mount to mount pilot to a Becker Refresh valve actuator, inside an instrument cabinet, or to a Becker instrumentation post.
2. Additional options will become available at a future date.

VRP Series Pilot Accessories

Realize Optimum Performance of your VRP Series Pilot with these popular instrumentation accessories.

Bleed to Pressure System (BPS)

Most 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 Series Atmospheric Bleed Control may be installed for automatic switching that temporarily permits atmospheric bleed. The AB-Control will maintain adequate differential pressure between supply gas and discharge pressure to operate the control valve actuator and 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.

SP Series Setpoint Pump

Provides a simple and accurate method of applying false signal pressure during initial adjustment of pilots. 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 Setpoint Pilot is compatible with all models and series of Becker VRP Pilots.

Reference Becker SP Setpoint Pump sales literature for additional information.

RSM Series Remote Setpoint Module

The **Remote Set point Module (RSM)** provides remote adjustment of VRP set point via an electrical input signal. All Remote Setpoint Motors are equipped with internal limit switches to prevent over-travel of setpoint. A 4-20 mA feedback of Remote Setpoint Module motor is standard. All Becker RSMs are rated explosion proof Class 1, Div. 1 for use in hazardous locations.

The standard RSM input signals are:

Digital Pulse Input	**Analog Current Input**
• 24 V D.C.	• 4-20 mA command signal/12 or 24 V A.C. supply power
• 120 V A.C.	• 4-20 mA command signal/120 V A.C. supply power

Reference Becker RSM Remote Setpoint Module sales literature for additional information.

Volume Boosters

Volume Boosters are utilized in conjunction with some Becker control instrumentation to provide adequate instrumentation flow volume for larger volume piston actuators. Volume Boosters are typically only required for ball valve regulators models 10L and larger. Additionally, Volume Boosters may be utilized to provide increased actuator stroking speed for applications 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.

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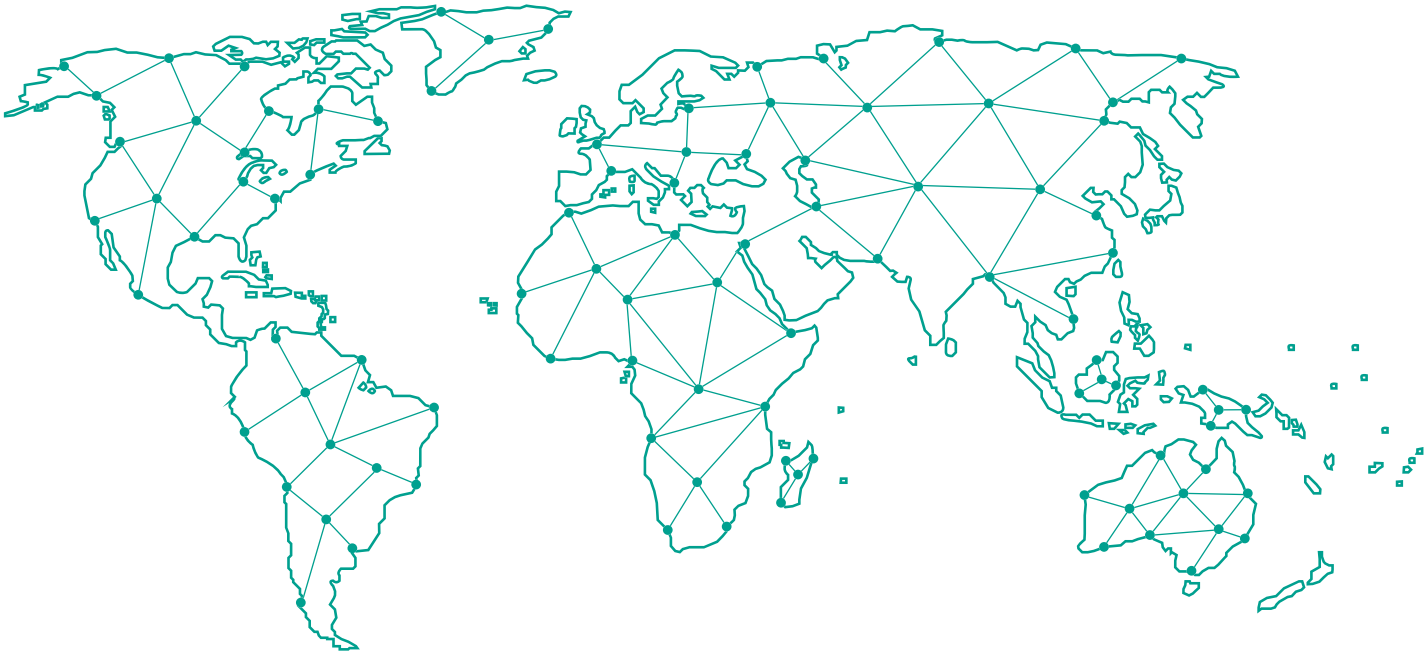

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