

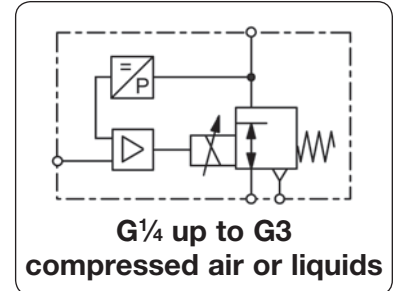
# Volume Booster / Proportional Valve Combination

## What are volume booster / proportional valve combinations used for?

Combinations of volume boosters and proportional valves lend themselves for electronically regulating high volume flows. On the one hand common proportional valves are not available with connection sizes big enough, on the other hand combinations are in most cases more economic. There are two ways of regulating: Single loop systems are suitable for standard applications without high requirements for accuracy and without consideration of pressure drop at high flow. Double loop regulations on the contrary are much more accurate and also qualified for dynamic processes.

### General operational description:

The volume booster and proportional valve are fed by the supply pressure. When no command signal is applied the outlet pressure behind the booster is zero. When the command signal is increased the outlet pressure rises in proportion to it. Since the transmission ratio is not exactly 1:1, a slight pressure difference occurs between the outlet pressure of the proportional valve and the booster's outlet on single loop systems. This can be balanced by a feedback signal (double loop), though.



## Single loop

At single loop combinations the pressure difference between command signal and outlet pressure is being ignored because the proportional valve only refers to its own outlet pressure within the pilot chamber. The outlet pressure performance is dependent of the volume booster's accuracy.

## Double loop

Combinations with a second feedback have the possibility to balance pressure differences. For this a pressure transducer is installed in the outlet line of the booster. The electrical signal of the transducer is applied as a feedback signal onto the proportional valve. The valve detects any pressure differences and compensates them automatically. In high flow applications a pressure drop at the outlet of the pilot regulator is thus minimised.

## General features

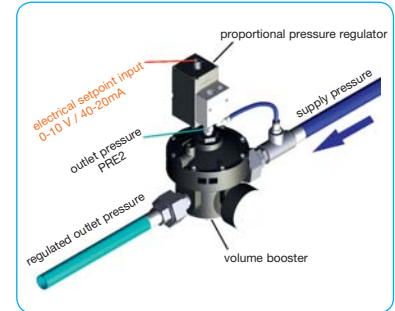
<b>Construction type</b>	The volume booster / proportional valve combinations are delivered completely assembled and calibrated.
<b>Mounting position</b>	preferred horizontal (see figure)
<b>Protection class</b>	IP 54 with ordinary coupling socket as standard, optionally IP 65 for some devices (see according product information sheets)
<b>Temperature range</b>	0 °C to 50 °C / 32 °F to 122 °F for all proportional valves, for booster ranges refer to according product sheets

## Pneumatic features

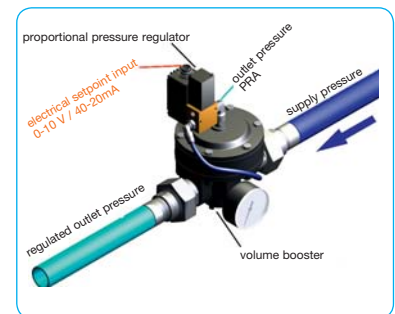
<b>Command signal</b>	The proportional valves may only be fed with dry and 5 µm filtered compressed air. The pneumatic command signal must always be air!
<b>Media</b>	Preferred dry, 5 µm filtered compressed air for supply of the proportional valves. The volume boosters can operate with air or non-corrosive gases, model R120 even with liquids. The respective air consumption and the relieving function strongly have to be regarded.
<b>Inlet pressure</b>	dependent of the according combination (see according product information sheets)
<b>Pressure supply</b>	The proportional valve has to be separately supplied with compressed air with regard to the valve's maximum inlet pressure.
<b>Exhaust</b>	The proportional valve exhausts only the booster's pilot chamber. The booster, if in relieving version, exhausts the volume of the supply pressure line. The relief capacity is subject to the differential pressure.
<b>Volume flow</b>	see specifications of the according volume booster

## Electrical features

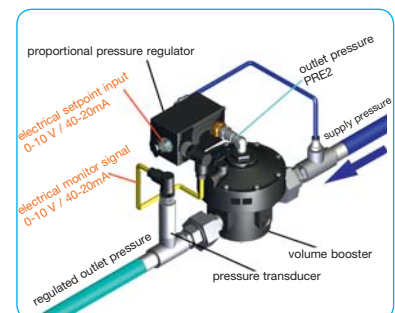
<b>Supply voltage</b>	All valves have to be supplied with 24 V DC.
<b>Power consumption</b>	see according product information sheets
<b>Setpoint input</b>	0-10 V as standard, optionally 4-20 mA for all valves
<b>Monitor signal</b>	A feedback signal is not reasonable for the single loop version because here only the pressure of the booster's pilot chamber is monitored. That value does not give any information about the outlet pressure behind the booster.



**PRE2, R450 with single loop**



**PRA, R119 with single loop**

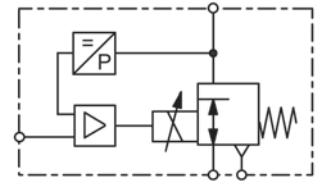


**PQ2, R450 with double loop**

**General operational description:**

The volume booster and proportional valve are fed by the supply pressure. When no command signal is applied the outlet pressure behind the booster is zero. When the command signal is increased the outlet pressure rises in proportion to it. Since the transmission ratio is not exactly 1:1, a slight pressure difference occurs between the outlet pressure of the proportional valve and the booster's outlet on single loop systems. This can be balanced by a feedback signal (double loop), though.

At single loop combinations the pressure difference between command signal and outlet pressure is being ignored because the proportional valve only refers to its own outlet pressure within the pilot chamber. The outlet pressure performance is dependent of the volume booster's accuracy.



**G<sup>1</sup>/<sub>4</sub> up to G3  
compressed air or liquids**

## Single loop combination examples

Flow rate l/min	Connection thread G	Outlet pressure bar	Part number Booster	Part number Prop.valve	Order number of combination
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**R750 with PRE1, for compressed air or non-corrosive gases** setpoint 0-10 V, P<sub>1</sub> max. 17 bar

1000	G <sup>1</sup> / <sub>4</sub>	0... 8	R750-02I	PRE1-U08	<b>BP1U750-02</b>
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**R450 with PRE1, for compressed air or non-corrosive gases** setpoint 0-10 V, P<sub>1</sub> max. 17 bar

4000	G <sup>1</sup> / <sub>2</sub>	0... 8	R450-04I	PRE1-U08	<b>BP1U450-04</b>
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**R119 with PPA, for compressed air or non-corrosive gases** setpoint 0-10 V, P<sub>1</sub> max. 21 bar

5600	G <sup>1</sup> / <sub>2</sub>	0... 10	R119-04J	PPA00-1000	<b>BP1U119-04</b>
9000	G <sup>3</sup> / <sub>4</sub>	0... 10	R119-06J	PPA00-1000	<b>BP1U119-06</b>
10000	G1	0... 10	R119-08J	PPA00-1000	<b>BP1U119-08</b>
12000	G1 <sup>1</sup> / <sub>2</sub>	0... 10	R119-12J	PPA00-1000	<b>BP1U119-12</b>
42000	G2	0... 10	R119-16J	PPA00-1000	<b>BP1U119-16</b>
44000	G2 <sup>1</sup> / <sub>2</sub>	0... 10	R119-20J	PPA00-1000	<b>BP1U119-20</b>
110000	G3	0... 10	R119-24J	PPA00-1000	<b>BP1U119-24</b>

**RGB4 with PRE1-.A2, for compressed air or gases** setpoint 0-10 V, P<sub>1</sub> max. 4 bar

700	G <sup>1</sup> / <sub>2</sub>	0...0,2	RGB4-04J	PRE1-UA2	<b>BP1UGB4-04</b>
2800	G1	0...0,2	RGB4-08J	PRE1-UA2	<b>BP1UGB4-08</b>
5600	G1 <sup>1</sup> / <sub>2</sub>	0...0,2	RGB4-12J	PRE1-UA2	<b>BP1UGB4-12</b>

**RZ1 with PRE1-.01/02, for compressed air or gases** setpoint 0-10 V, P<sub>1</sub> max. 16 bar

2900	G1	0... 1	RZ1-08J	PRE1-U02	<b>BP1UZ-08</b>
5700	G1 <sup>1</sup> / <sub>2</sub>	0... 1	RZ1-12J	PRE1-U02	<b>BP1UZ-12</b>
21000	G2	0... 1	RZ1-16J	PRE1-U02	<b>BP1UZ-16</b>

**R120 with PPA, for compressed air, gases or liquids** setpoint 0-10 V, P<sub>1</sub> max. 50 bar

1200	G <sup>1</sup> / <sub>2</sub>	0... 15	R120-04J2	PPA00-1600	<b>BP1U120-04</b>
4200	G <sup>3</sup> / <sub>4</sub>	0... 15	R120-06J2	PPA00-1600	<b>BP1U120-06</b>
5000	G1	0... 15	R120-08J2	PPA00-1600	<b>BP1U120-08</b>
1200	G <sup>1</sup> / <sub>2</sub>	0... 50	R120-04J5	PP000-5000	<b>BP1U120-04J5</b>
4200	G <sup>3</sup> / <sub>4</sub>	0... 50	R120-06J5	PP000-5000	<b>BP1U120-06J5</b>
5000	G1	0... 50	R120-08J5	PP000-5000	<b>BP1U120-08J5</b>
14000	G1 <sup>1</sup> / <sub>2</sub>	0... 50	R120-12J5	PP000-5000	<b>BP1U120-12J5</b>
15000	G2	0... 50	R120-16J5	PP000-5000	<b>BP1U120-16J5</b>

**Special options,** add the appropriate letter

4-20 mA	input signal	BP1I...-....
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BP1U450-04



BP1U119-16



BP1UZ-08



BP1U120-08J5

Gauges: see chapter for measuring devices  
Further details: see chapter for single devices

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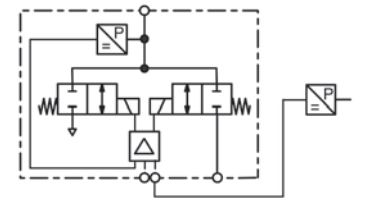
Order example:  
BP1U750-02



### General operational description:

The volume booster and proportional valve are fed by the supply pressure. When no command signal is applied the outlet pressure behind the booster is zero. When the command signal is increased the outlet pressure rises in proportion to it. Since the transmission ratio is not exactly 1:1, a slight pressure difference occurs between the outlet pressure of the proportional valve and the booster's outlet on single loop systems. This can be balanced by a feedback signal (double loop), though.

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**G $\frac{1}{2}$  up to G2**  
compressed air or non-corrosive gases

### Double loop combination example

Flow rate l/min	Connection thread G	Outlet pressure bar	Sensor	Part number Booster	Prop.valve	Order number of combination
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#### R450 with PQ2, for compressed air or non-corrosive gases setpoint 0-10 V, P<sub>1</sub> max. 17 bar

4 000	G $\frac{1}{2}$	0... 1	DAV-01H	R450-04I	PQ2EE-01	<b>BP2U450-0401</b>
		0... 6	DAV-06H	R450-04I	PQ2EE-06	<b>BP2U450-0406</b>
		0... 10	DAV-10H	R450-04I	PQ2EE-10	<b>BP2U450-0410</b>



BP2U450-0406

#### R200 with PQ2, for compressed air or non-corrosive gases setpoint 0-10 V, P<sub>1</sub> max. 17 bar

28 000	G1	0... 1	DAV-01H	R200-08I	PQ2EE-01	<b>BP2U200-0801</b>
		0... 6	DAV-06H	R200-08I	PQ2EE-06	<b>BP2U200-0806</b>
		0... 10	DAV-10H	R200-08I	PQ2EE-10	<b>BP2U200-0810</b>



BP2U200-0806

#### RGB4 with PQ2, for compressed air or gases setpoint 0-10 V, P<sub>1</sub> max. 4 bar

700	G $\frac{1}{2}$	0...0.35	DAV-C4H	RGB4-04J	PQ2EE-C4	<b>BP2UGB4-04</b>
2 800	G1	0...0.35	DAV-C4H	RGB4-08J	PQ2EE-C4	<b>BP2UGB4-08</b>
5 600	G $\frac{1}{2}$	0...0.35	DAV-C4H	RGB4-12J	PQ2EE-C4	<b>BP2UGB4-12</b>



BP2UGB4-12

#### RZ1 with PQ2, for compressed air or gases setpoint 0-10 V, P<sub>1</sub> max. 16 bar

2 900	G1	0...1	DAV-01H	RZ1-08J	PQ2EE-01	<b>BP2UZ-08</b>
5 700	G $\frac{1}{2}$	0...1	DAV-01H	RZ1-12J	PQ2EE-01	<b>BP2UZ-12</b>
21 000	G2	0...1	DAV-01H	RZ1-16J	PQ2EE-01	<b>BP2UZ-16</b>

### Special options, add the appropriate letter

4-20 mA      input signal      BP2I ...-....



Gauges: see chapter for measuring devices  
Further details: see chapter for single devices

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Order example:  
BP2U450-0401