# PRESSURE BOOSTER
## SERIES BPA

News

Sizes: 40, 63, 100

- Easy and flexible installation
- Focused pressure increase
- Optimisation of the pneumatic circuit
- Energy efficient

This pressure booster has a pressure ratio of 2:1 that increases outlet pressure by up to 20 bar. It operates automatically when needed to generate a constant pressure increase while its mechanical design guarantees quick and easy installation, minimises heat generation and improves machine safety.
Two versions are available, with or without an integrated regulator that allows to adjust the desired outlet pressure and enables the efficient management of energy consumption.
It offers a compact, functional design with rapid filling times that makes the Series BPA ideal for applications where high pressure is only needed at specific points in the pneumatic circuit such as woodworking, marble and glass processing or with testing and assembly machines.



## GENERAL DATA

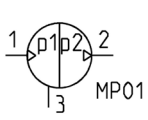
| | | | |
|---|---|---|---|
| **Sizes** | 40 | 63 | 100 |
| **Multiplication Ratio (Pout:Pin)** | 2:1 | 2:1 | 2:1 |
| **Inlet pressure** | 2-10 bar | 2-8 bar | 2-8 bar |
| **Operating temperature** | 0-50 °C | 0-50 °C | 0-50 °C |
| **Mounting position** | any position | any position | any position |
| **Flow rate (Pin = Pout = 5 bar)** | 250 l/min ANR | 700 l/min ANR | 1200 l/min ANR |
| **Pneumatic connection** | G1/4" | G3/8" | G1/2" |
| **Weight (standard version)** | 0,85 Kg | 3,00 Kg | 5,90 Kg |
| **Weight (version with regulator)** | 1,06 Kg | 3.21 Kg | 6,11 Kg |
| **Materials** | Body and barrels: aluminium - Rod: steel - Seals NBR | Body and end caps: aluminium - Barrels: extruded aluminium - Rod: steel - Seals: NBR | Body and end caps: aluminium - Barrels: extruded aluminium - Rod: steel - Seals NBR |

## CODING EXAMPLE

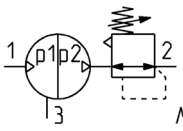
| BPA | - | 040 | - | R1 |
|---|---|---|---|---|

| | |
|---|---|
| **BPA** | **SERIES** |
| **040** | **SIZES:**<br>40<br>63<br>100 |
| **R1** | **REGULATOR**<br>= without regulator - MP01<br>R1 = with regulator (P.IN 2-8bar - P.OUT 0-10bar) - MP02<br>R2 = with regulator (P.IN 2-10bar - P.OUT 0-16bar) - MP02 |

## PNEUMATIC SYMBOLS



MP01

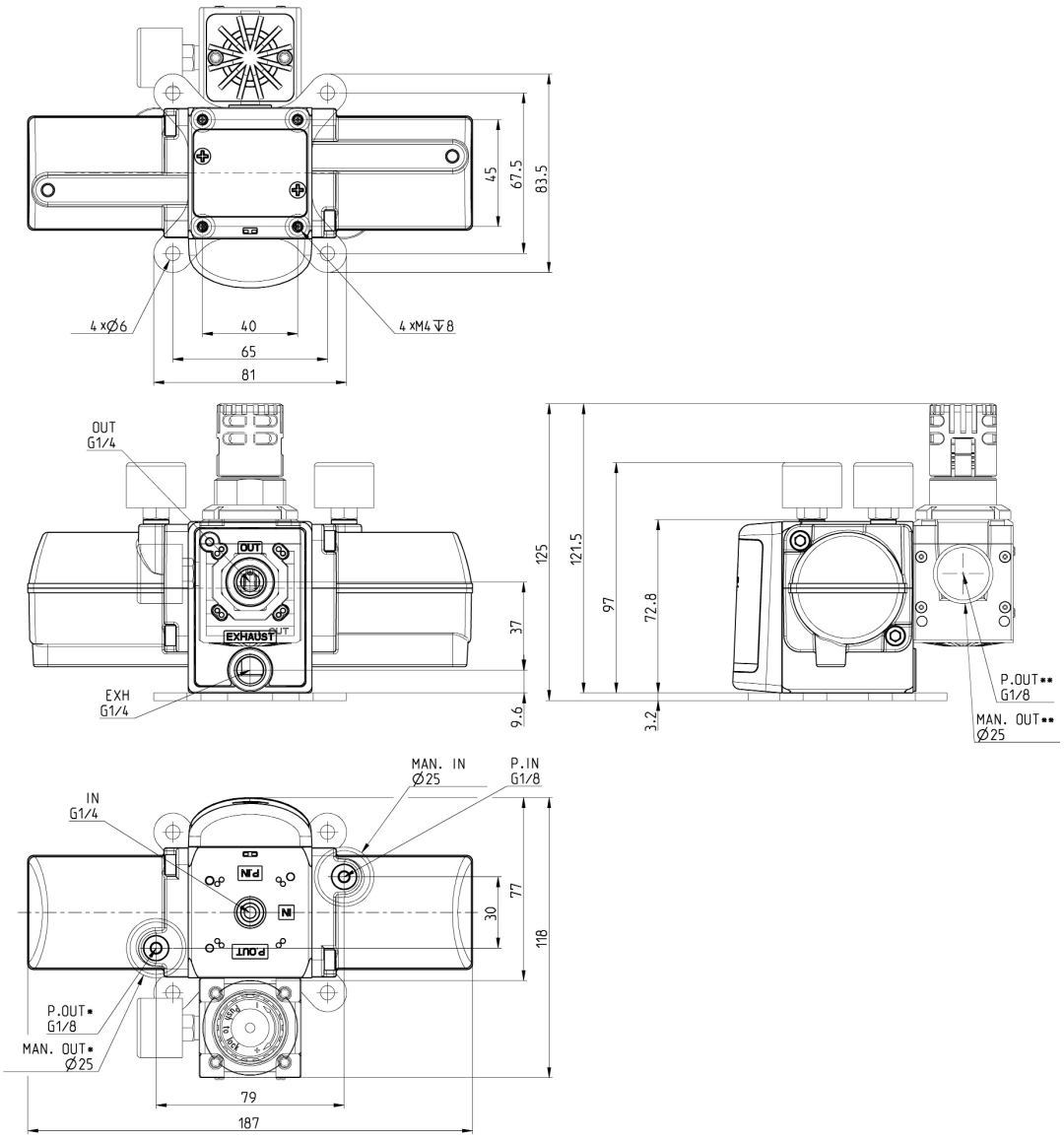


MP02

Products designed for industrial applications. General terms and conditions for sale are available on www.camozzi.com
This document contains a description of the products offered by Camozzi Automation at time of publication.
For more complete and up to date information about the Camozzi Automation product range, please refer to our online catalogue at http://catalogue.camozzi.com/

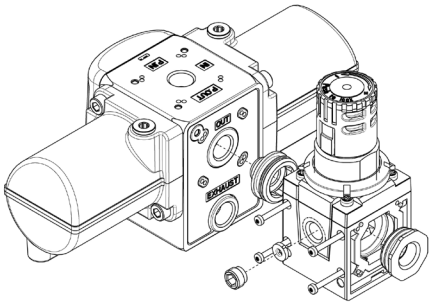
PRESSURE BOOSTER
SERIES BPA - DIMENSIONAL CHARACTERISTICS

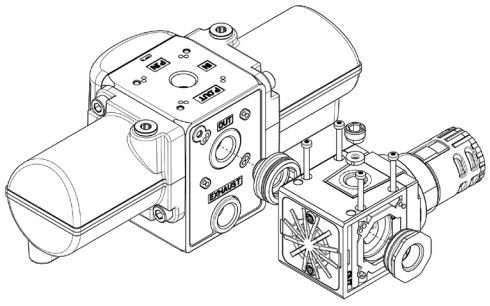
## BPA multiplier - Size 40




* = port of pressure gauge, version without regulator
** = port of pressure gauge, version with R1, R2 regulator

## Examples of mounting





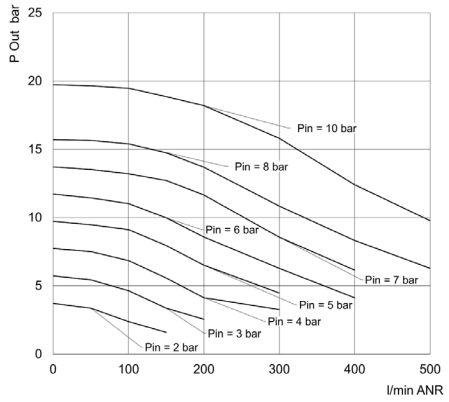




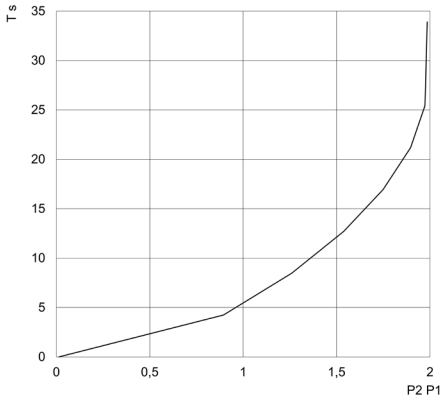
Products designed for industrial applications. General terms and conditions for sale are available on www.camozzi.com
This document contains a description of the products offered by Camozzi Automation at time of publication.
For more complete and up to date information about the Camozzi Automation product range, please refer to our online catalogue at http://catalogue.camozzi.com/

## Size 40 - Booster flow rate without regulator

### Booster flow rate without regulator

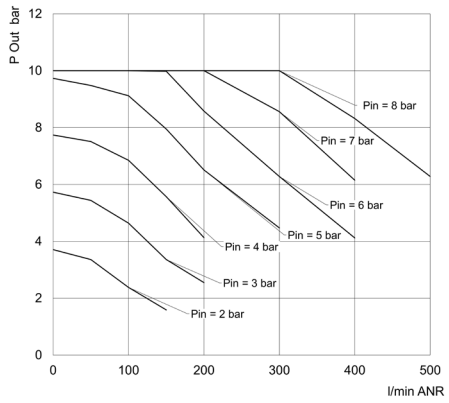



### Tank's filling time (10 l)



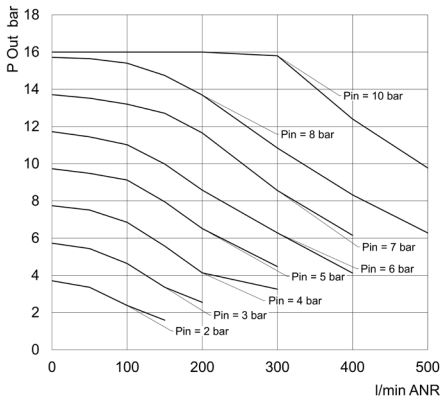

## Size 40 - Booster flow rate with regulator

### BPA-040-R1



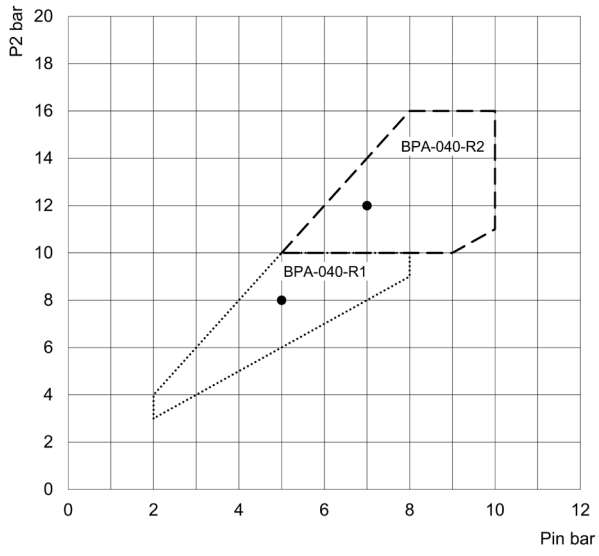

**P.IN MAX = 8 bar**
**P.OUT MAX = 10 bar**

### BPA-040-R2




**P.IN MAX = 10 bar**
**P.OUT MAX = 16 bar**

## Size 40 - Optimal range of use for booster with regulator




The graph shows the optimal range of use for the two booster models with regulator.

For example:
- Booster inlet pressure Pin = 5 bar, regulated outlet pressure Pout = 8 bar, you choose BPA-040-R1

- Booster inlet pressure Pin = 7 bar, regulated outlet pressure Pout = 12 bar, you choose BPA-040-R2

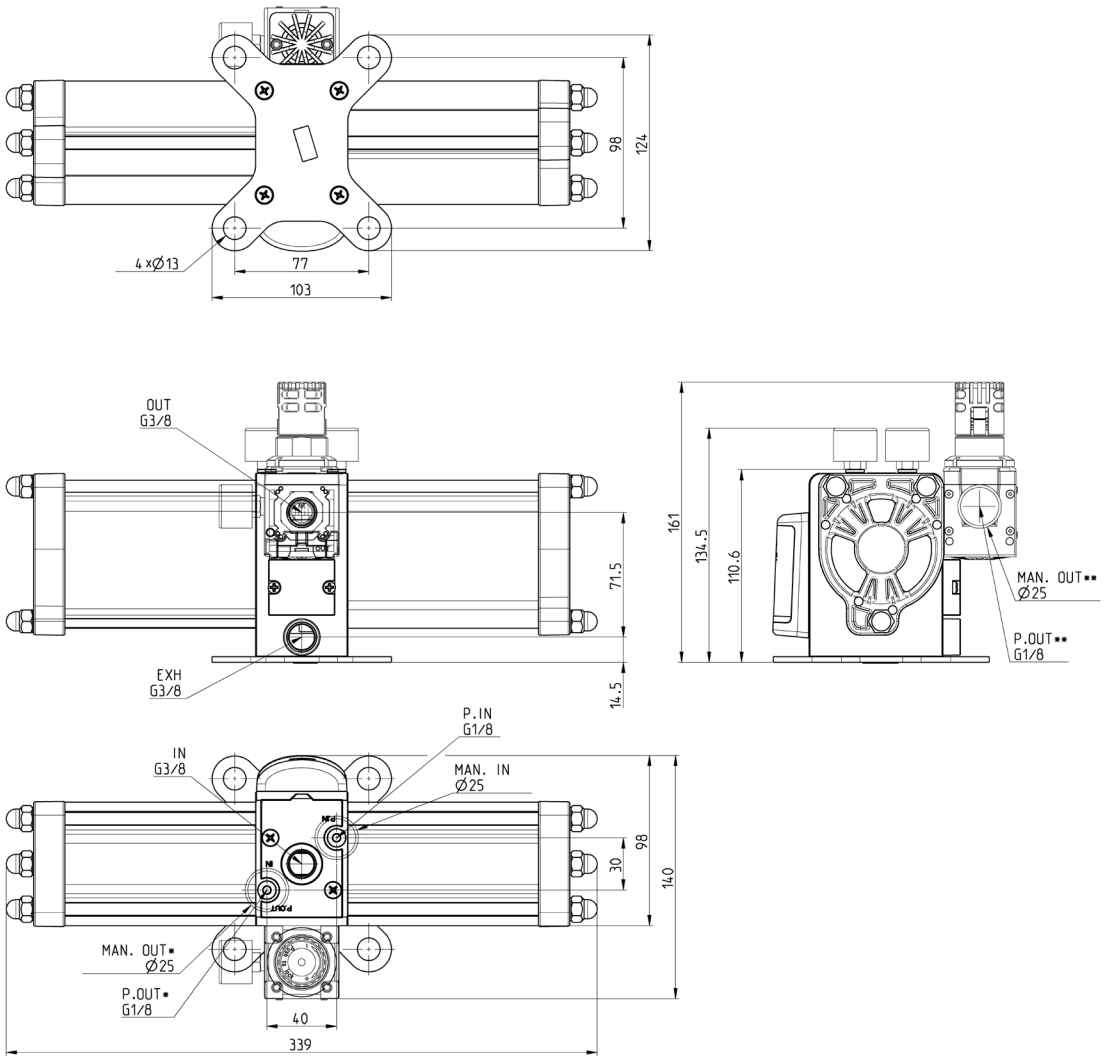


Products designed for industrial applications. General terms and conditions for sale are available on www.camozzi.com
This document contains a description of the products offered by Camozzi Automation at time of publication.
For more complete and up to date information about the Camozzi Automation product range, please refer to our online catalogue at http://catalogue.camozzi.com/

PRESSURE BOOSTER
SERIES BPA - DIMENSIONAL CHARACTERISTICS

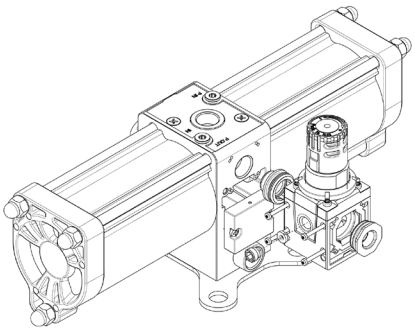
## BPA multiplier - Size 63

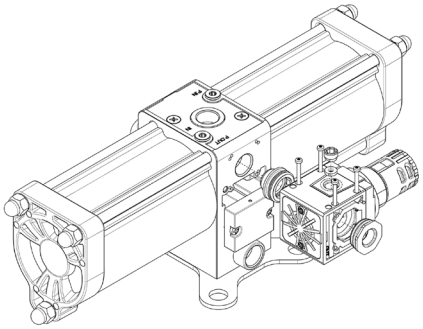
News




* = version without regulator
** = version with R1, R2 regulator

## Examples of mounting





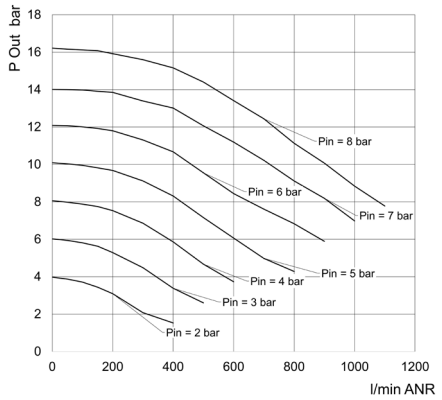




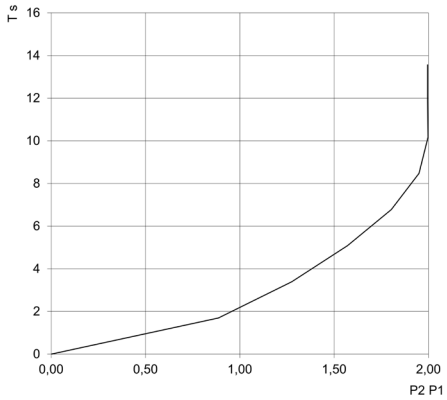
Products designed for industrial applications. General terms and conditions for sale are available on www.camozzi.com
This document contains a description of the products offered by Camozzi Automation at time of publication.
For more complete and up to date information about the Camozzi Automation product range, please refer to our online catalogue at http://catalogue.camozzi.com/

## Size 63 - Booster flow rate without regulator

### Booster flow rate without regulator

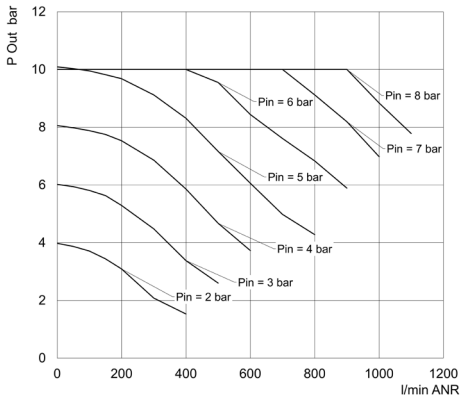



### Tank's filling time (10 l)



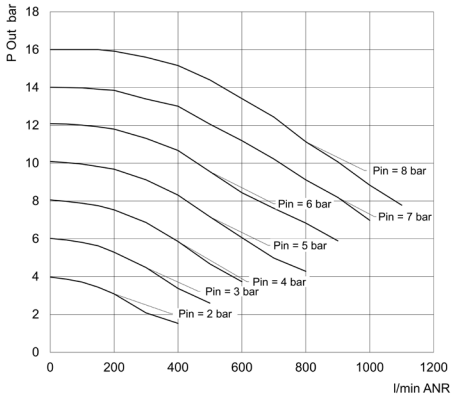

## Size 63 - Booster flow rate with regulator

### BPA-063-R1



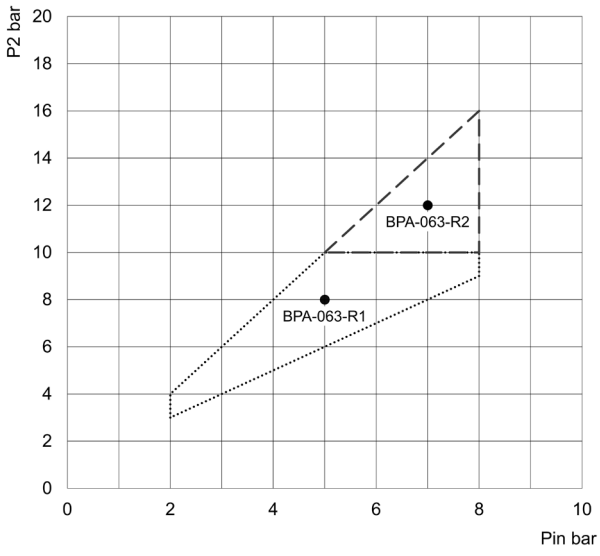

**P.IN MAX = 8 bar**
**P.OUT MAX = 10 bar**

### BPA-063-R2




**P.IN MAX = 8 bar**
**P.OUT MAX = 16 bar**

## Size 63 - Optimal range of use for booster with regulator




The graph shows the optimal range of use for the two booster models with regulator.

For example:
- Booster inlet pressure Pin = 5 bar, regulated outlet pressure Pout = 8 bar, you choose BPA-063-R1

- Booster inlet pressure Pin = 7 bar, regulated outlet pressure Pout = 12 bar, you choose BPA-063-R2

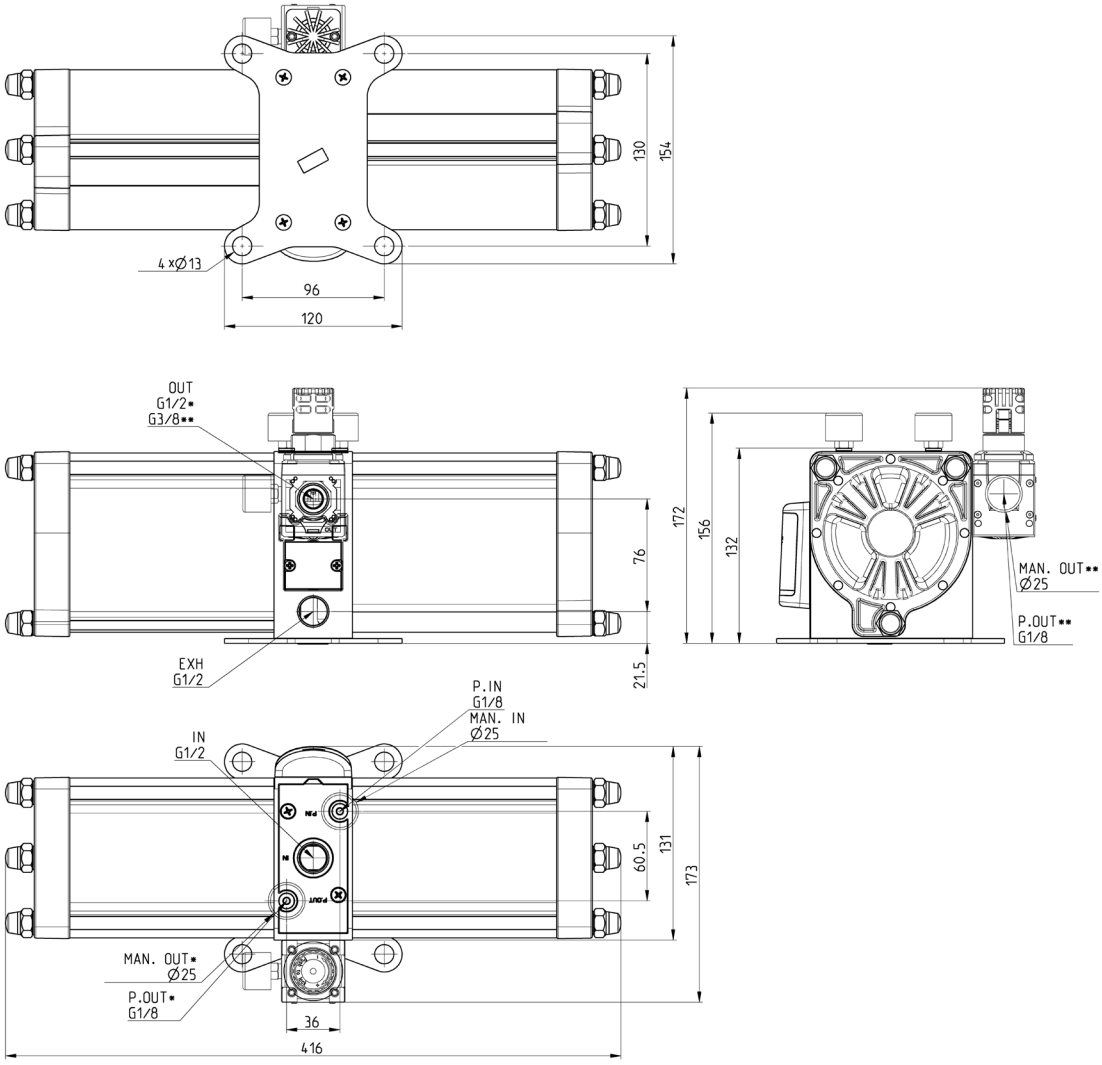


Products designed for industrial applications. General terms and conditions for sale are available on www.camozzi.com
This document contains a description of the products offered by Camozzi Automation at time of publication.
For more complete and up to date information about the Camozzi Automation product range, please refer to our online catalogue at http://catalogue.camozzi.com/

PRESSURE BOOSTER
SERIES BPA - DIMENSIONAL CHARACTERISTICS

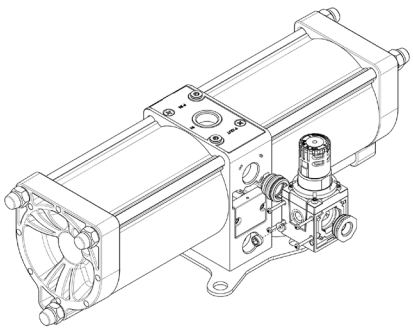
## BPA multiplier - Size 100

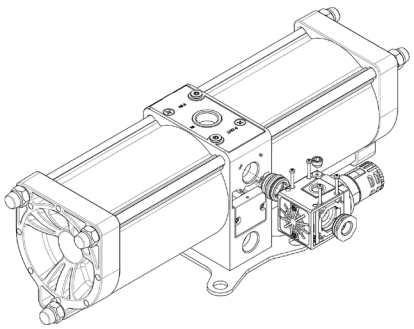
News




* = version without regulator
** = version with R1, R2 regulator

## Examples of mounting





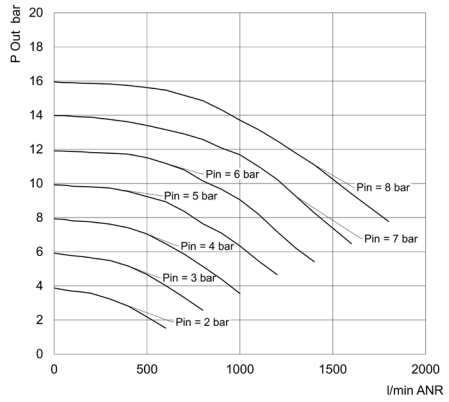




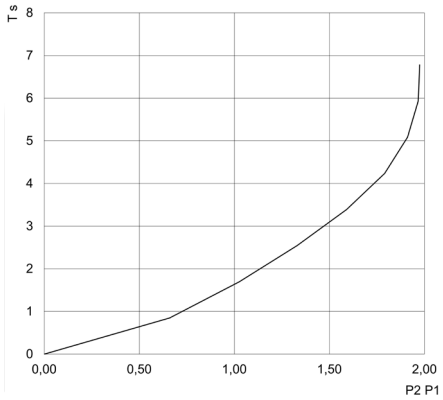
Products designed for industrial applications. General terms and conditions for sale are available on www.camozzi.com
This document contains a description of the products offered by Camozzi Automation at time of publication.
For more complete and up to date information about the Camozzi Automation product range, please refer to our online catalogue at http://catalogue.camozzi.com/

## Size 100 - Booster flow rate without regulator

### Booster flow rate without regulator

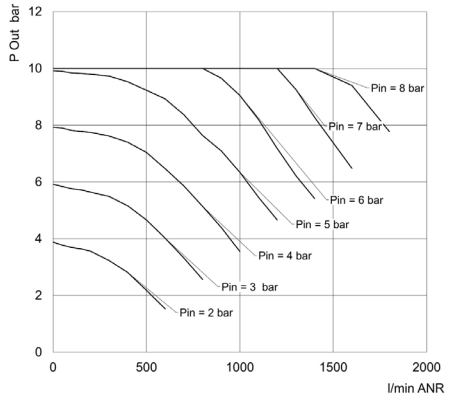



### Tank's filling time (10 l)



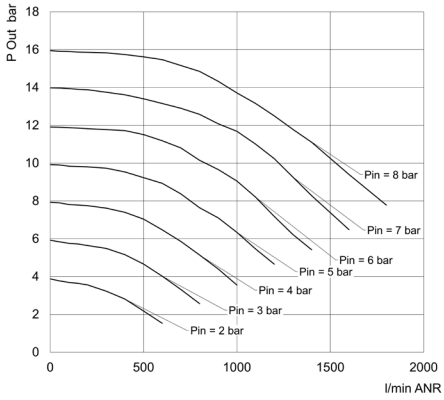

## Size 100 - Booster flow rate with regulator

### BPA-100-R1



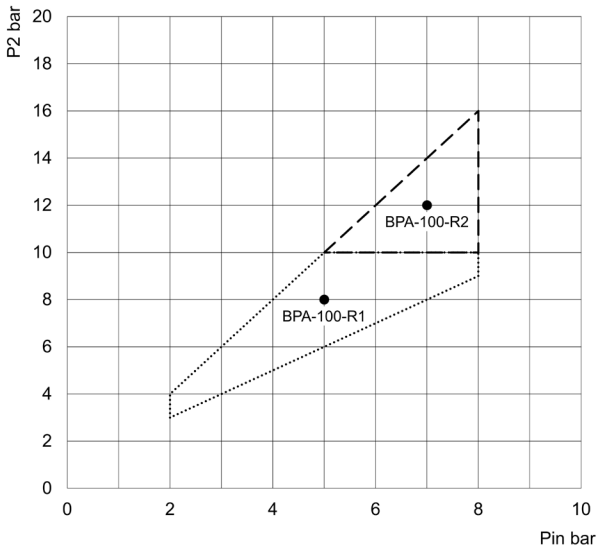

**P.IN MAX = 8 bar**
**P.OUT MAX = 10 bar**

### BPA-100-R2




**P.IN MAX = 8 bar**
**P.OUT MAX = 16 bar**

## Size 100 - Optimal range of use for booster with regulator




The graph shows the optimal range of use for the two booster models with regulator.

For example:
- Booster inlet pressure Pin = 5 bar, regulated outlet pressure Pout = 8 bar, you choose BPA-100-R1

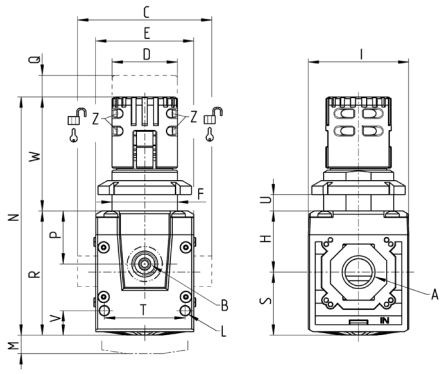
- Booster inlet pressure Pin = 7 bar, regulated outlet pressure Pout = 12 bar, you choose BPA-100-R2



Products designed for industrial applications. General terms and conditions for sale are available on www.camozzi.com
This document contains a description of the products offered by Camozzi Automation at time of publication.
For more complete and up to date information about the Camozzi Automation product range, please refer to our online catalogue at http://catalogue.camozzi.com/

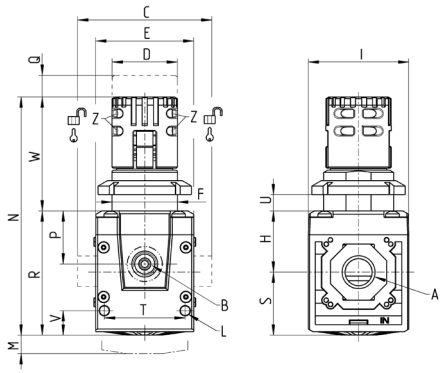
## Pressure regulators for BPA- ...R1

PR02 = regulator with relieving




| Mod. | A | B | C | D | E | F | H | I | L | M | N | P | Q | R | S | T | U | V | W | Weight (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MD1-R000 | - | G1/8 | 42 | Ø28 | 42 | M28x1.5 | 26.2 | 43 | Ø4 | 16 | 102 | 22.7 | 4 | 53.2 | 27 | 34.6 | 0 ÷ 11 | 10.5 | 48.8 | 0.2 |

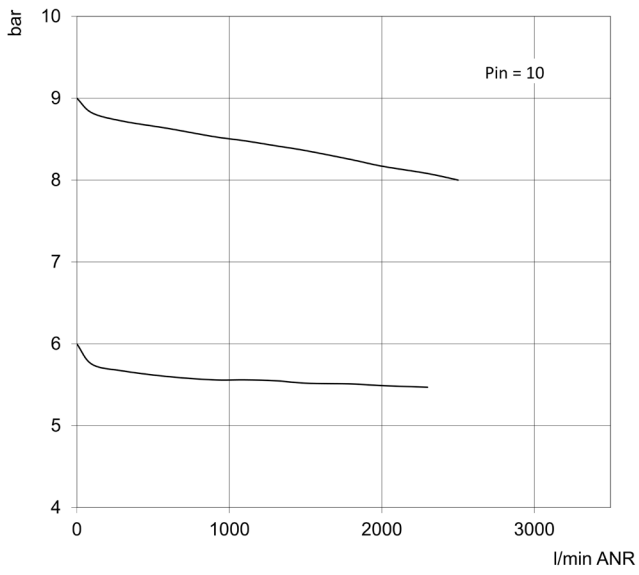
## High pressure regulator for BPA- ...R2



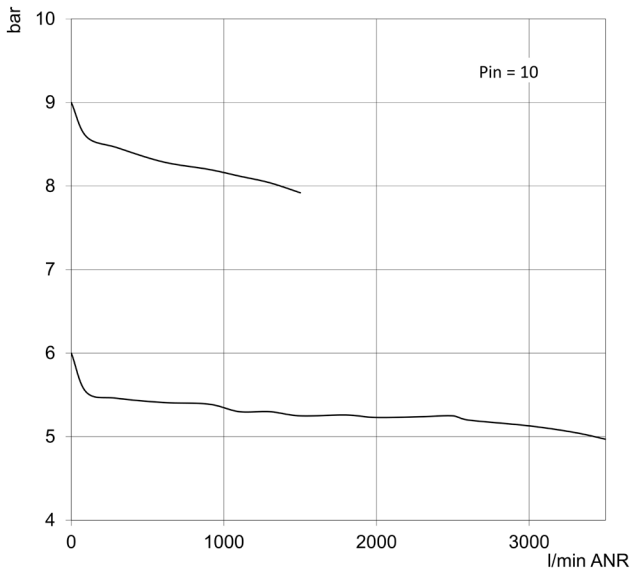

| Mod. | A | B | C | D | E | F | H | I | L | M | N | P | Q | R | S | T | U | V | W | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MD1-R900 | - | G1/8 | 42 | Ø28 | 42 | M28X1,5 | 26.2 | 43 | Ø4 | 16 | 102 | 22.7 | 4 | 53.2 | 27 | 34.6 | 0 ÷ 11 | 10.5 | 48.8 | 0.2 |

## Regulator flow rate diagrams of the regulator

### MD1-R000




### MD1-R900



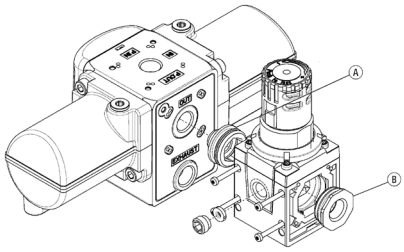





Products designed for industrial applications. General terms and conditions for sale are available on www.camozzi.com
This document contains a description of the products offered by Camozzi Automation at time of publication.
For more complete and up to date information about the Camozzi Automation product range, please refer to our online catalogue at http://catalogue.camozzi.com/

## BPA fixing kit with MD Series

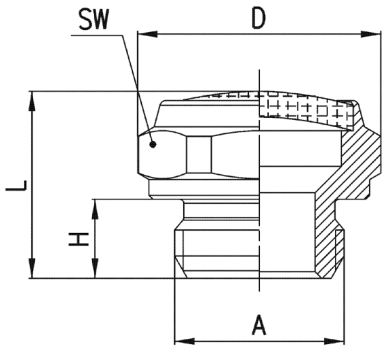
**The kit includes:**
2x bushing with OR
4x special Ø4.5x34 white zinc-plated screws
1x plug with seal




| Mod. | A | B |
|---|---|---|
| **BPA-1/4-C** | G1/4 | G1/4 |
| **BPA-3/8-C** | G3/8 | G3/8 |
| **BPA-1/2-C** | G1/2 | G3/8 |

## Silencers Series 2901

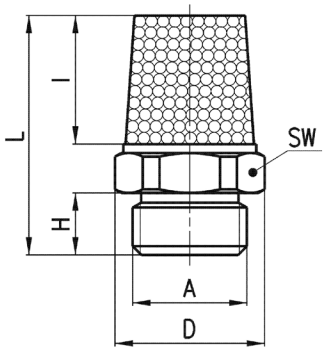
*SIL1*




| Mod. | A | D | H | L | SW | Max operating pressure (bar) | Flow rate (Nl/min) | Noise db (A) |
|---|---|---|---|---|---|---|---|---|
| **2901 1/4-17** | G1/4 | 18.5 | 6 | 14 | 17 | 10 | 1000 | 78 |
| **2901 3/8** | G3/8 | 23.5 | 7 | 16 | 22 | 10 | 1500 | 76 |
| **2901 1/2** | G1/2 | 29.5 | 8 | 17.5 | 27 | 10 | 3400 | 86 |

## Silencers Series 2931

*SIL1*



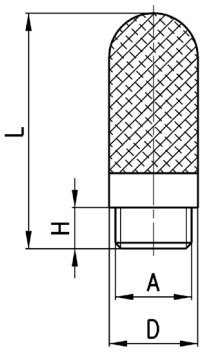

| Mod. | A | D | H | I | L | SW | Max. Oper. Pressure | Flow rate (Nl/min) | Noise db (A) |
|---|---|---|---|---|---|---|---|---|---|
| **2931 1/4** | G1/4 | 16.2 | 6 | 16.5 | 27 | 15 | 10 | 3200 | 86 |
| **2931 3/8** | G3/8 | 20 | 7 | 23 | 35.5 | 19 | 10 | 4560 | 81 |
| **2931 1/2** | G1/2 | 24.5 | 8 | 28 | 42 | 23 | 10 | 6800 | 87 |



Products designed for industrial applications. General terms and conditions for sale are available on www.camozzi.com
This document contains a description of the products offered by Camozzi Automation at time of publication.
For more complete and up to date information about the Camozzi Automation product range, please refer to our online catalogue at http://catalogue.camozzi.com/

## Silencers Series 2928

*SIL1*

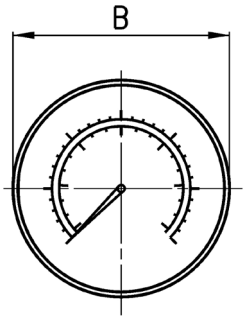


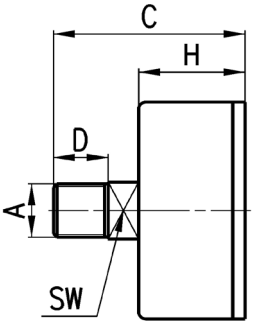

**Operating temperature:**
- 40 / + 80 °C

| Mod. | A | D | H | L | Max. Oper. Pressure | Flow rate (Nl/min) | Noise db (A) |
|---|---|---|---|---|---|---|---|
| **2928 1/4** | G1/4 | 16,6 | 7 | 42,5 | 10 | 2730 | 72 |
| **2928 3/8** | G3/8 | 18.8 | 11.5 | 67.5 | 10 | 6450 | 74 |
| **2928 1/2** | G1/2 | 24.8 | 10.5 | 79.5 | 10 | 8350 | 87 |

## Compact manometer

**Precision class CL4,0**

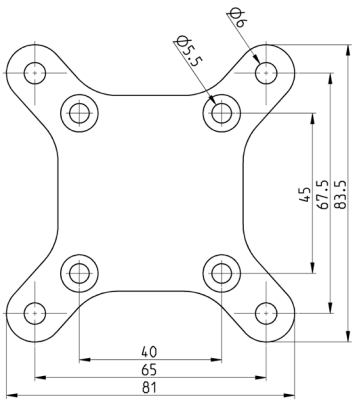



| Mod. | A | B | C | D | H | SW | Range |
|---|---|---|---|---|---|---|---|
| **M025-P10** | G1/8 | Ø25 | 28.5 | 7 | 15 | 11 | 0 ÷ 10 bar |
| **M025-P20** | G1/8 | Ø25 | 28.5 | 7 | 15 | 11 | 0 ÷ 20 bar |

## Size 40 - Fixing plate

**The kit includes:**
1x galvanised plate
4x galvanised screws M4x10




| Mod. |
|---|
| **BPA-040-ST** |





Products designed for industrial applications. General terms and conditions for sale are available on www.camozzi.com
This document contains a description of the products offered by Camozzi Automation at time of publication.
For more complete and up to date information about the Camozzi Automation product range, please refer to our online catalogue at http://catalogue.camozzi.com/

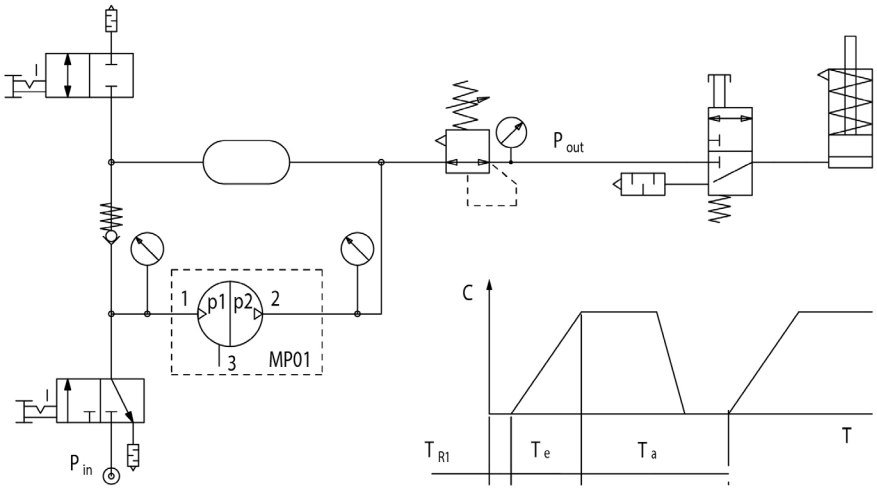
## Application example

Input data necessary for circuit dimensioning:

- Mains pressure (Booster inlet): *P*in = 7,5 bar
- Pressure needed by the cylinder to perform the task required: *P*out = 12 bar
- Multiplication ratio: R2 = 2
- Load pressure of the tank: *P*2 = *P*in · R2 = 15 bar
- Time in which the cylinder should perform the task: *Te* = 2 sec
- Waiting time between subsequent manoeuvres: *Ta* = 30 sec
- Cylinder diameter: *D* = 63 mm
- Cylinder stroke: *C* = 200 mm
- Booster size: 40

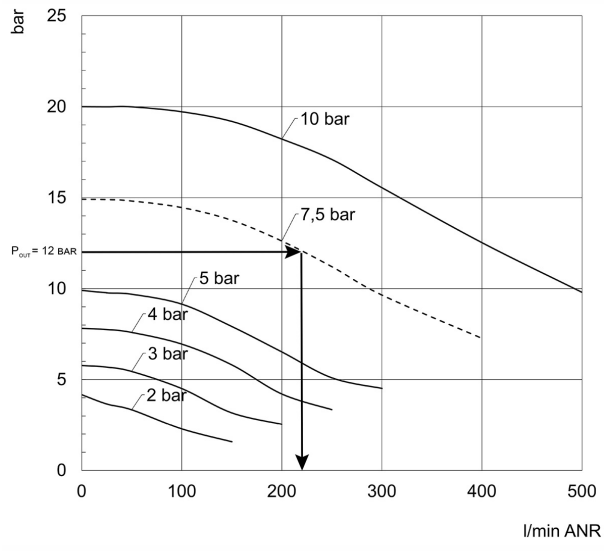
Calculation of the air quantity required by the cylinder during the work phase:

$$Q_{cil} = \left(\frac{D^2 \cdot \pi}{4}\right) \cdot C \cdot \frac{(P_{out} + 1.013)}{T_e} = 0{,}3115 \cdot 2 \cdot 6{,}5 = 4{,}05 \frac{L}{sec} = 243 \frac{L}{min}$$




## Calculation of the Booster's flow rate

### Flow rate of a size 40 Booster without regulator




The air flow rate that can be provided by a size 40 Booster, with a $P_{in}$ of 7,5 bar and a $P_2$ of 15 bar (ratio 2:1) can be found through the flow rate graph on the catalogue:

At a required Pout of 12 bar, the air flow rate that can be provided by the Booster is *Q*Booster = 217 *L*/min

$$t = \frac{T_{R2} - T_{R1}}{10L} = \frac{34 - 14}{10} = 2 \frac{sec}{L}$$

As previously calculated, the quantity of air required by the cylinder to perform the task within the desired time $Q_{cil} = 243 \frac{L}{min}$ .

The flow rate of a size 40 Booster is lower than the flow rate required by the cylinder, it is necessary to use a bigger Booster or to insert a buffer tank.



Products designed for industrial applications. General terms and conditions for sale are available on www.camozzi.com
This document contains a description of the products offered by Camozzi Automation at time of publication.
For more complete and up to date information about the Camozzi Automation product range, please refer to our online catalogue at http://catalogue.camozzi.com/

PRESSURE BOOSTER
SERIES BPA - APPLICATION EXAMPLE

## Dimensioning of buffer tank

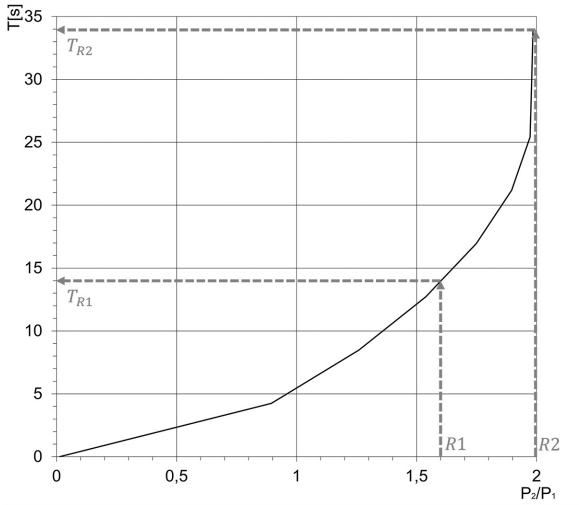
1. Calculate the initial multiplication ratio: $R1 = \frac{P_{out}}{P_{in}} = \frac{12}{7,5} = 1.6$
2. Through the graph you can find the filling time of a tank with a volume of 10 litres at a pressure of 12 bar.
   2.1. Find the time relating to multiplication ratio R1: $T_{R1} = 14$ sec
   2.2. Find the time relating to multiplication ratio R2: $T_{R2} = 34$ sec
3. Calculate the normalised filling time, in seconds per litre of the tank: $t = \frac{T_{R2} - T_{R1}}{10L} = \frac{34 - 14}{10} = 2\frac{sec}{L}$

To avoid that the pressure of the tank falls below the necessary pressure of the system downstream, it will be necessary to use a tank with a volume of:

$$V = \frac{0.5 \cdot \left(Q_{cil} - \frac{Q_{booster}}{2}\right) \cdot T_e}{1.22} \cdot \frac{P_{in}}{(P_2 - P_{out})} = \frac{0.5 \cdot \left(243 - \frac{217}{2}\right) \cdot 2}{1.22} \cdot \frac{7,5}{(15 - 12)} = 4,6\ L$$

- Calculate the tank's filling time: $T = t \cdot V = 2 \cdot 4,6 \cong 9\ s$
- Verify that the filling time of the tank is less than the waiting time between two subsequent manoeuvres: $T \leq T_a \rightarrow 9$ sec $< 30$ sec $\rightarrow$ ***VERIFIED***

If this condition is not verified, go to the next size up of the booster or use more boosters in parallel.




## Dimensioning of the supply line

For a correct dimensioning, the air flow rate required by the device must be less than the air provided by the Booster, with a correction factor K = 2,2
In the end you must verify that the supply line has a minimum capacity of:

$$Q_{in} = K \cdot \min\left(\frac{Q_{booster}}{Q_{cil}}\right) = 2,2 \cdot \min\left(\frac{217}{243}\right) = 2,2 \cdot 217 = 477\frac{L}{\min}$$

To obtain maximum efficiency and flow rate of the device, the maximum air requirement is shown in the following table:

| **BPA-040** | BPA-063 | BPA-100 |
|---|---|---|
| $1000\frac{\boldsymbol{L}}{\boldsymbol{\min}}\boldsymbol{ANR}$ | $2000\frac{L}{\min}ANR$ | $3000\frac{L}{\min}ANR$ |

You therefore need to choose the right size for the 3/2-way NC valve to supply the circuit in order to have a higher flow rate than the value required by the system. For example, supposing to use a valve Series VMS, the right choice will be the 1/4" size:

| **VMS 1/4** | VMS 3/8 | VMS 1/2 |
|---|---|---|
| $1200\frac{\boldsymbol{L}}{\boldsymbol{\min}}\boldsymbol{ANR}$ | $2100\frac{L}{\min}ANR$ | $3350\frac{L}{\min}ANR$ |

This calculation example is not valid if the version includes a regulator.





Products designed for industrial applications. General terms and conditions for sale are available on www.camozzi.com
This document contains a description of the products offered by Camozzi Automation at time of publication.
For more complete and up to date information about the Camozzi Automation product range, please refer to our online catalogue at http://catalogue.camozzi.com/