

WVBA - Series Booster Regulator



Ordering Code

WVBA - Series Booster Regulator

WVBA 40A - □ 04 □ - □

Body size

10A	1/4", Knob-operated type	Pressure increase ratio: Twice
20A	3/8", Knob-operated type	
40A	1/2", Knob-operated type	
22A	3/8", Air-operated type	
42A	1/2", Air-operated type	
43A	1/2", Max. operating pressure 1.6 MPa	Pressure increase ratio: 2 to 4 times
11A	1/4", Knob-operated type	

* Set the pressure increase ratio to 2 or more.

Port size

Symbol	Port size	Applicable series
02	1/4	WVBA1□A
03	3/8	WVBA2□A
04	1/2	WVBA4□A

Semi-standard

Nil: Standard product
Z*: Pressure unit on the product name label: psi
• Pressure unit on the pressure gauge: MPa and psi
* Thread type: NPT, NPTF

Option

Nil: None
G: Pressure gauge
N: Silencer
S: High-noise reduction silencer*
GN: Pressure gauge, Silencer
GS: Pressure gauge, High-noise reduction silencer*
LN: Elbow silencer*
LS: Elbow high-noise reduction silencer*
GLN: Pressure gauge, Elbow silencer*
GLS: Pressure gauge, Elbow high-noise reduction silencer*
* Refer to "Combination of Thread Type and Options."

Thread type

Nil: Rc
F: G
N: NPT
T: NPTF

* Thread types apply to the IN, OUT, and EXH ports of the VBA1□A and to the IN, OUT, EXH, and gauge ports of the VBA2□A and VBA4□A. The gauge ports of the VBA1□A are Rc thread type regardless of the thread type indication.

Combination of Thread Type and Options

Body size	Thread type	Option										Semi-standard	
		Nil	G	N	S	GN	GS	LN	LS	GLN	GLS	Nil	-Z
10A 11A	Nil	●	●	●	●	●	●	●	●	●	●	●	-
	F	●	●	●	●	●	●	●	●	●	●	●	-
	N	●	●	●	●	●	●	●	●	●	●	●	-
20A 22A	T	●	●	●	●	●	●	●	●	●	●	●	-
	Nil	●	●	●	●	●	●	●	●	●	●	●	-
	F	●	●	●	●	●	●	●	●	●	●	●	-
40A 42A 43A	N	●	●	●	●	●	●	●	●	●	●	●	-
	T	●	●	●	●	●	●	●	●	●	●	●	-
	Nil	●	●	●	●	●	●	●	●	●	●	●	-

Air Tank Compatibility Chart

Air tank	WVBA10A/11A	WVBA20A/22A	WVBA40A/22A	WVBA43A
WVBAT05A(1)	●	-	-	-
WVBAT05S(1)	●	-	-	-
WVBAT10A(1)	●	●	-	-
WVBAT10S(1)	●	●	-	-
WVBAT20A(1)	-	●	●	-
WVBAT20S(1)	-	●	●	-
WVBAT38A(1)	-	●	●	-
WVBAT38S(1)	-	●	●	-

WVBA - Series Booster Regulator

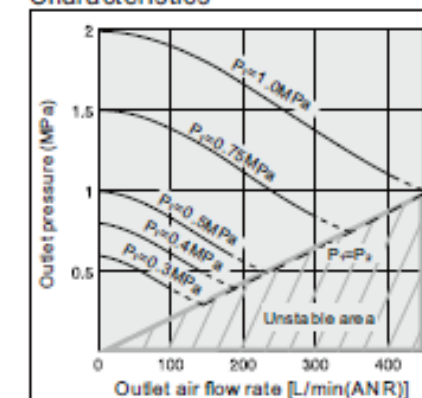
Specifications

Model	WVBA11A-02	WVBA20A-03	WVBA40A-04	WVBA22A-03	WVBA42A-04	WVBA43A-04	WVBA11A-02
Working medium	Clean Air						
Pressure increase ratio	Twice						2 to 4 times ^{*4)}
Pressure adjustment mechanism	Knob-operated with relief mechanism ^{*2)}			Air-operated		Knob-operated with relief mechanism ^{*2)}	
Max. flow rate [L/min(ANR)] ^{*3)}	230	1000	1900	1000	1900	1600	70
Set pressure range (MPa)	0.2 to 2.0	0.2 to 1.0		0.2 to 1.0		0.2 to 1.6	0.4 to 2.0
Supply pressure range (MPa)	0.1 to 1.0	0.1 to 0.9				0.1 to 1.0	
Proof pressure (MPa)	3	1.5				2.4	3
Port size (Rc) (IN/OUT/EXH: 3 locations)	1/4	3/8	1/2	3/8	1/2		1/4
Pressure gauge port size (Rc) (IN/OUT: 2 locations)	1/8						
Tank connection port (with plug) ^{*5)}	1/4	3/8	1/2	3/8	1/2		1/4
Working temperature (°C)	2 to 50 (No freezing)						
Installation	Horizontal						
Lubrication	Grease (Non-lube)						

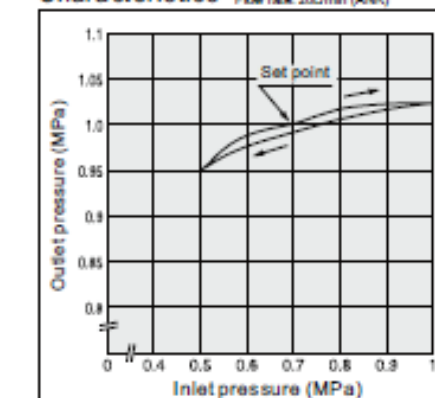
- *1) Be sure to secure an air supply capacity of the minimum operating pressure (0.1 MPa) or more.
- *2) If the OUT pressure is higher than the set pressure by the knob, excess pressure is exhausted from the back of the knob.
- *3) Flow rate at IN=OUT=0.5 MPa. The pressure varies depending on the operating conditions. Refer to "Flow Rate Characteristics".
- *4) Set the pressure increase ratio to 2 or more.
- *5) The tank connection port cannot be used for applications other than the connection with VBAT.

WVBA10A

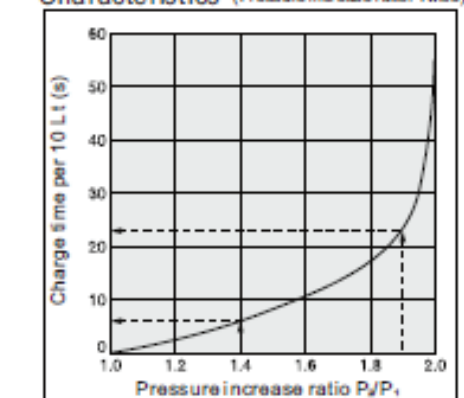
Flow Rate Characteristics*



Pressure Characteristics



Charge Characteristics (Pressure increase ratio: Twice)



- The time required to charge pressure in the tank from 0.7 MPa to 0.95 MPa at 0.5 MPa supply pressure:

$$\frac{P_2}{P_1} = \frac{0.7}{0.5} = 1.4 \quad \frac{P_2}{P_1} = \frac{0.95}{0.5} = 1.9$$

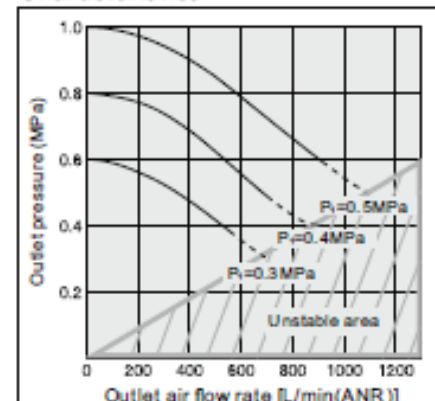
- With the pressure increase ratio from 1.4 to 1.9, the charge time of 23 - 6 = 17 sec. (t) is given by the graph. Then, the charge time (T) for a 10 L tank:

$$T = t \times \frac{V}{10} = 17 \times \frac{10}{10} = 17 \text{ (s)}$$

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WVBA20A,22A

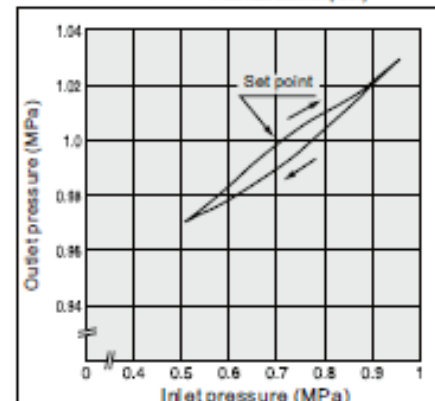
Flow Rate Characteristics*



• The time required to charge pressure in the tank from 0.8 MPa to 1.0 MPa at 0.5 MPa supply pressure:

$$\frac{P_2}{P_1} = \frac{0.8}{0.5} = 1.6 \quad \frac{P_2}{P_1} = \frac{1.0}{0.5} = 2.0$$

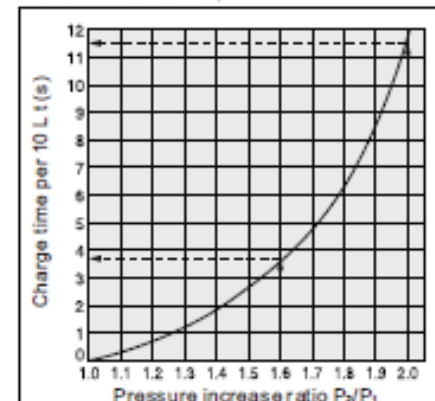
Pressure Characteristics



• With the pressure increase ratio from 1.6 to 2.0, the charge time of 11.5 – 3.8 = 7.7 sec. (t) is given by the graph. Then, the charge time (T) for a 100 L tank:

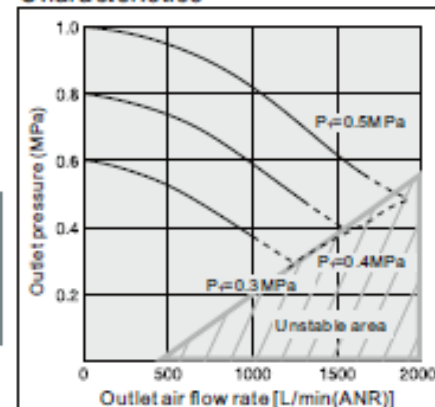
$$T = t \times \frac{V}{10} = 7.7 \times \frac{100}{10} = 77.7 \text{ (s)}$$

Charge Characteristics (Pressure increase ratio: Twice)



WVBA40A,42A

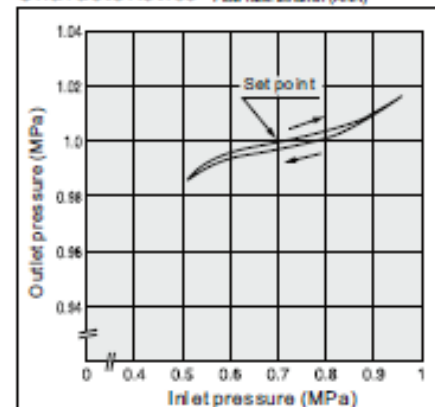
Flow Rate Characteristics*



• The time required to charge pressure in the tank from 0.8 MPa to 1.0 MPa at 0.5 MPa supply pressure:

$$\frac{P_2}{P_1} = \frac{0.8}{0.5} = 1.6 \quad \frac{P_2}{P_1} = \frac{1.0}{0.5} = 2.0$$

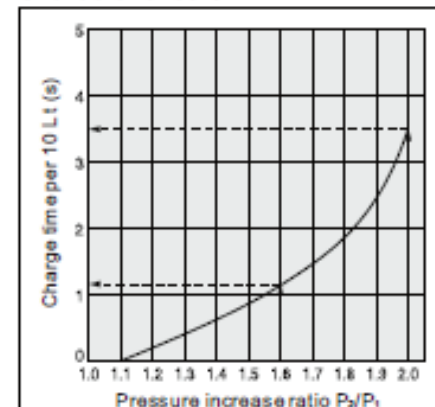
Pressure Characteristics



• With the pressure increase ratio from 1.6 to 2.0, the charge time of 3.5 – 1.1 = 2.4 sec. (t) is given by the graph. Then, the charge time (T) for a 100 L tank:

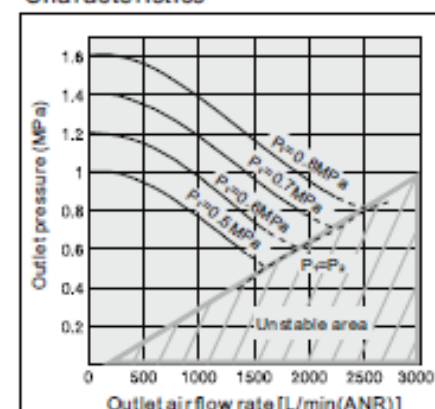
$$T = t \times \frac{V}{10} = 2.4 \times \frac{100}{10} = 24 \text{ (s)}$$

Charge Characteristics (Pressure increase ratio: Twice)



WVBA43A

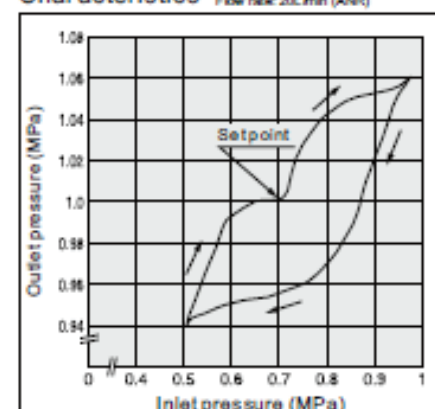
Flow Rate Characteristics*



• The time required to charge pressure in the tank from 0.8 MPa to 1.0 MPa at 0.5 MPa supply pressure:

$$\frac{P_2}{P_1} = \frac{0.8}{0.5} = 1.6 \quad \frac{P_2}{P_1} = \frac{1.0}{0.5} = 2.0$$

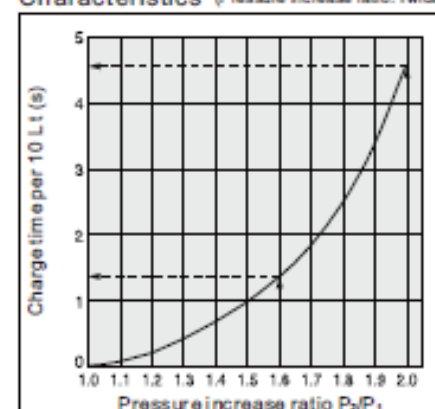
Pressure Characteristics



• With the pressure increase ratio from 1.6 to 2.0, the charge time of 4.5 – 1.3 = 3.2 sec. (t) is given by the graph. Then, the charge time (T) for a 100 L tank:

$$T = t \times \frac{V}{10} = 3.2 \times \frac{100}{10} = 32 \text{ (s)}$$

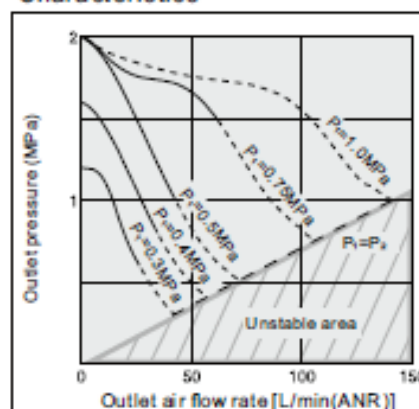
Charge Characteristics (Pressure increase ratio: Twice)



WVBA - Series Booster Regulator

WVBA11A

Flow Rate Characteristics*



• The time required to charge pressure in the tank from 1.0 MPa to 1.5 MPa at 0.5 MPa supply pressure:

$$\frac{P_2}{P_1} = \frac{1.0}{0.5} = 2.0 \quad \frac{P_2}{P_1} = \frac{1.5}{0.5} = 3.0$$

• With the pressure increase ratio from 2.0 to 3.0, the charge time of 147 – 58 = 89 sec. (t) is given by the graph. Then, the charge time (T) for a 10 L tank:

$$T = t \times \frac{V}{10} = 89 \times \frac{10}{10} = 89 \text{ (s)}$$

Solid line: Operating range

Operate so that the flow rate follows the solid line even when the outlet side air has been consumed.
Ex.) For the VBA10A: When the inlet pressure is 0.5 MPa and the set pressure is 1.0 MPa, operate at an outlet air flow rate of 180 L/min (ANR) or less.

Dotted line: Outside of the set pressure range

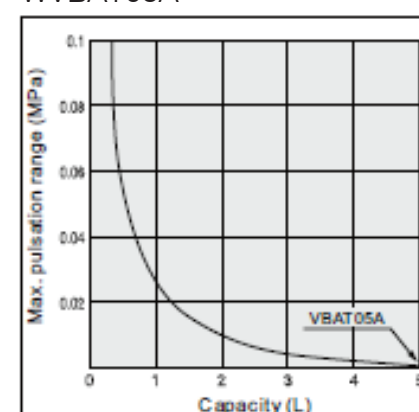
P₁: Inlet pressure P₂: Outlet pressure

* When operated at a flow rate that falls within the unstable area (P₂ < P₁ conditions) as shown in the graphs above, the booster regulator may not operate normally and may therefore fail to increase the pressure.

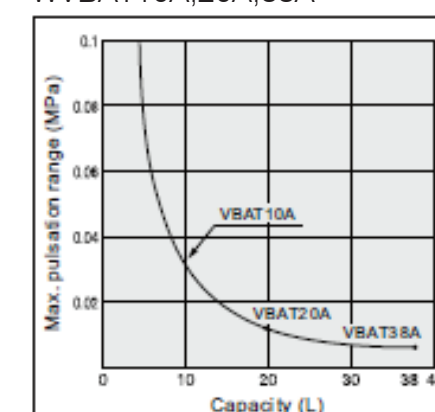
Tank Pressure Pulsation

Pulsation is decreased with a tank. If the outlet capacity is undersized, pulsation may occur.

WVBAT05A



WVBAT10A,20A,38A

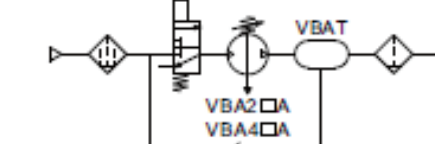
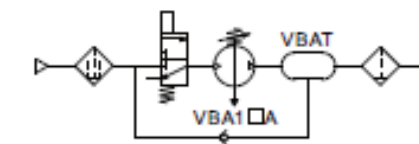


Conditions

Inlet pressure: 0.5 MPa
Outlet set pressure: 1 MPa
Flow rate: Between 0 and max. flow rate

Performance of air tank

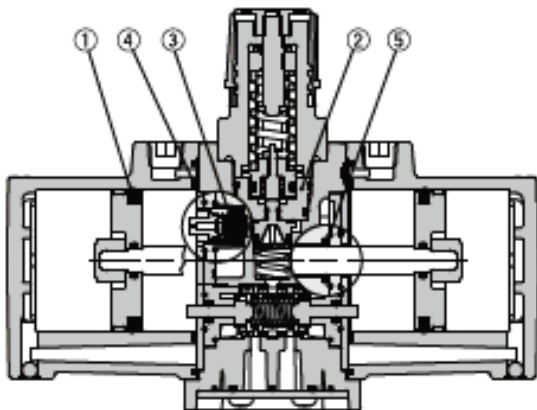
- Alleviates the pulsation generated on the outlet side.
- When air consumption exceeds air supply during intermittent operation, required air will be accumulated in the tank for use.
- This does not apply for continuous operation.
- Operation at a flow rate that falls within the unstable area under temporary P₂ ≥ P₁ conditions can be prevented when the outlet side air has been consumed.



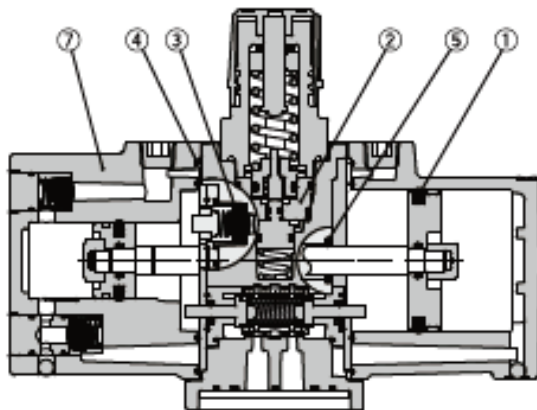
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Internal Structure

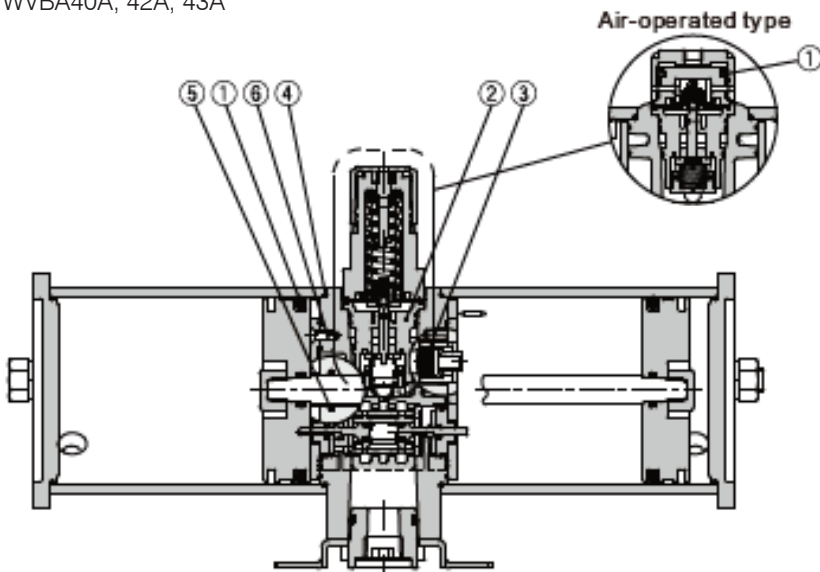
WVBA10A



WVBA11A



WVBA20A, 22A
WVBA40A, 42A, 43A



Replacement Parts/Kit No
Place an order with the following applicable kit number.

Model	WVBA10A	WVBA20A	WVBA40A	WVBA22A	WVBA42A	WVBA43A	WVBA11A
Kit No.	KT-WVBA10A-1	KT-WVBA20A-1	KT-WVBA40A-1	KT-WVBA22A-1	KT-WVBA42A-1	KT-WVBA43A-1	KT-WVBA43A-20

The kit includes the parts from ① to ⑦ and a grease pack.

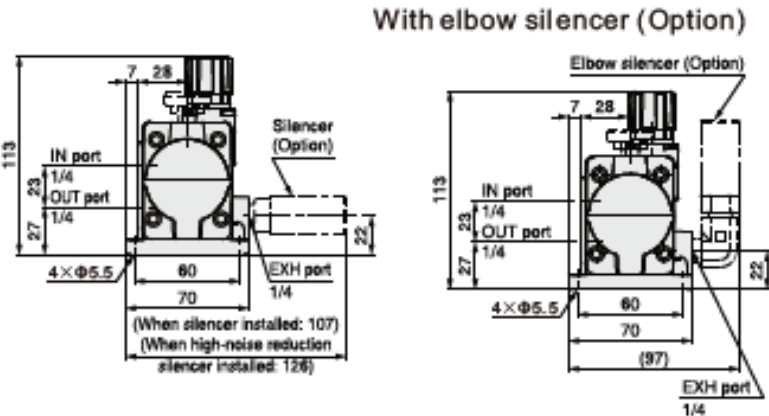
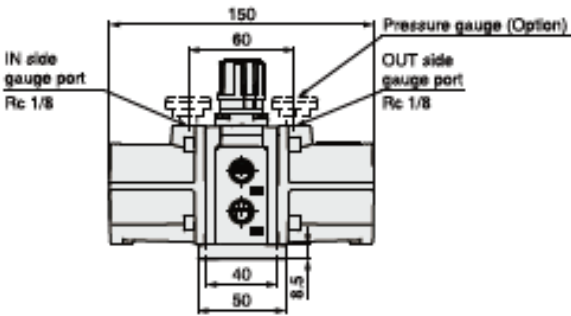
NO.	Description	Model	WVBA10A	WVBA20A	WVBA40A	WVBA22A	WVBA42A	WVBA43A	WVBA11A
		Quantity							
1	Piston seal	2				2 large 1 small		2	1 each large and small
2	Governor assembly	1							
3	Check valve	4							2
4	Gasket	2							
5	Rod seal	1							
6	Mounting screw	—	8	12	8	12			—
7	Cover C assembly	—							1
—	Grease pack	1	2		1	2			1

* The grease pack has 10 g of grease.

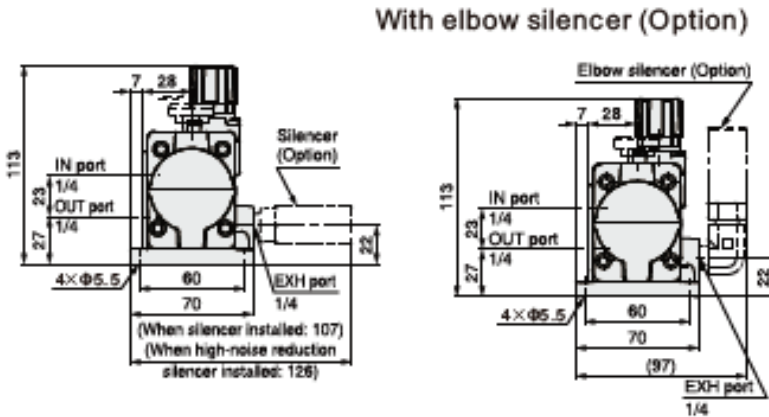
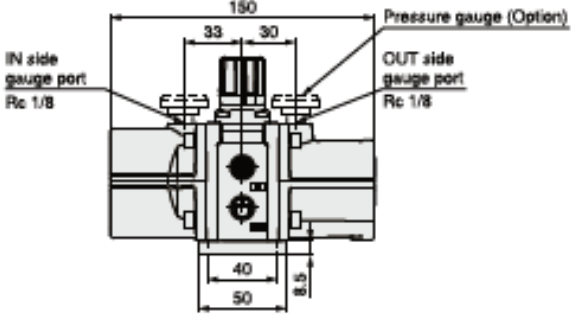
WVBA - Series Booster Regulator

Main Dimensions

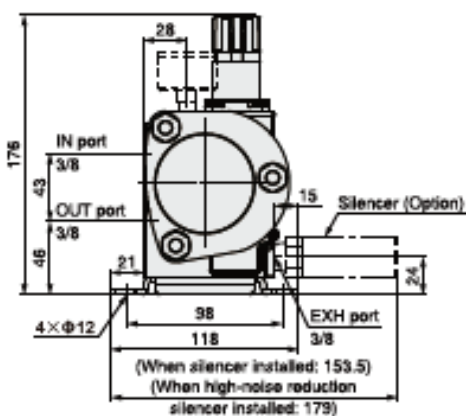
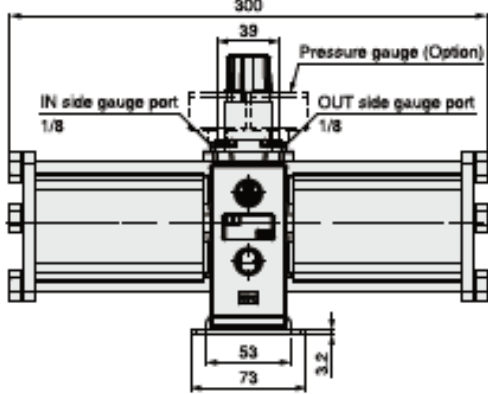
WVBA10A-02



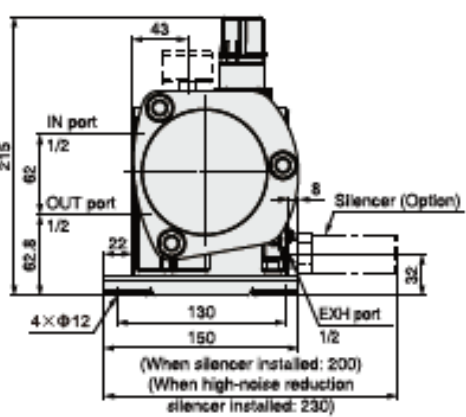
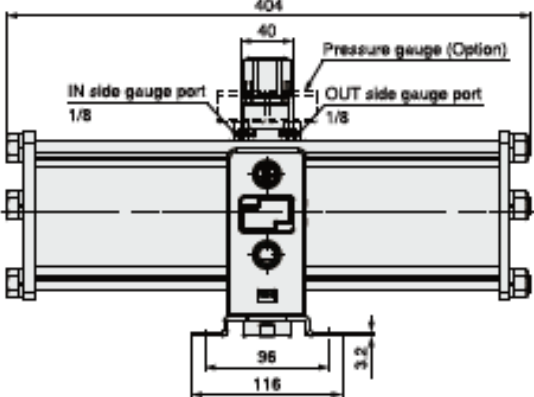
WVBA11A-02



WVBA20A-03



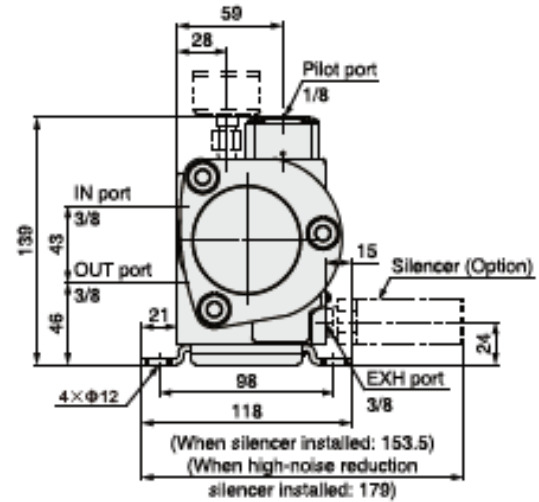
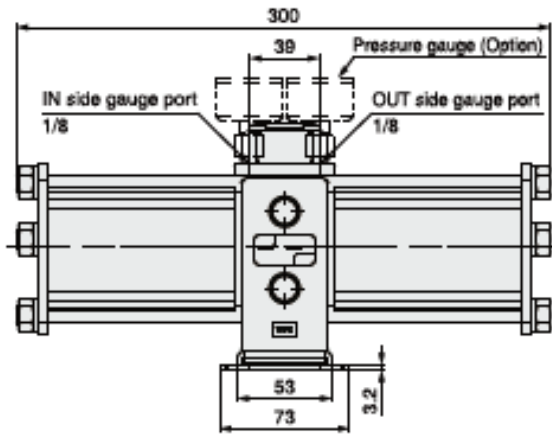
WVBA40A-04



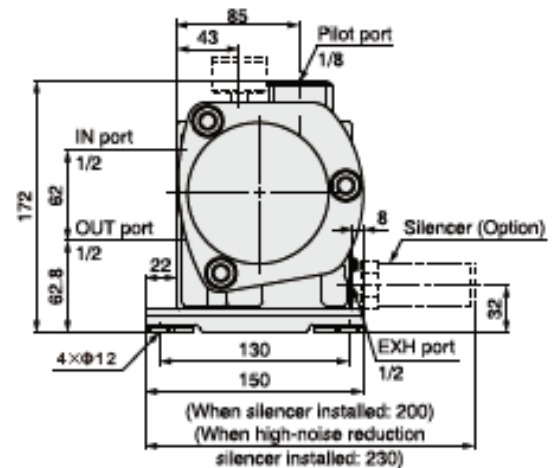
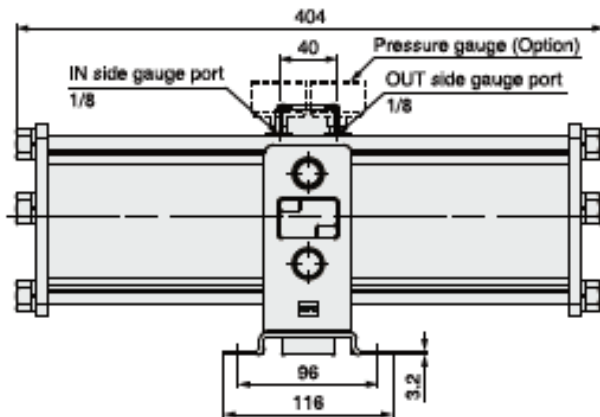
WVBA - Series Booster Regulator

Main Dimensions

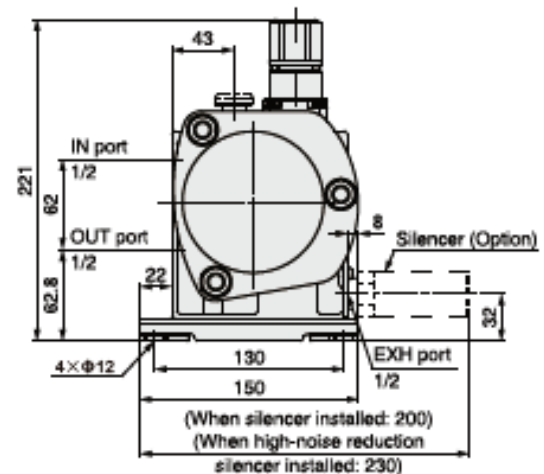
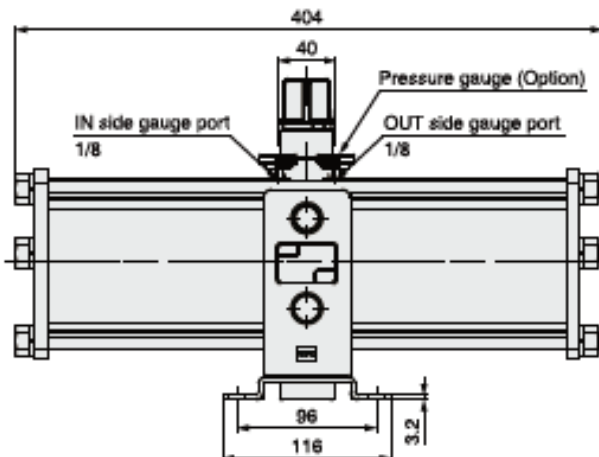
WVBA22A-03



WVBA42A-04



WVBA43A-04



* For detailed dimensions, specifications and lead times, please contact VPC.