Modular Air Unit

Air Unit Accessory

Pressure Controller

Air Dryers

AIR SERVICE UNIT / PRECAUTIONS ①

Be sure to read them before use.

DESIGN

⚠ WARNING

- As the transparent plastic(bowl, level gauge, sight glass) are made of polycarbonate, they cannot be used in the following working environments, chemicals or in an atmosphere, containing such chemicals.
  When using them in such environments or atmosphere, contact PARKER.

- Places exposed to direct sunlight or under a strong wind or where may be affected by outdoor temperature.

- When phosphate easter or polyester is included in the compressor and it reaches the polycarbonate parts.

- Chemicals shown below:
  (For question about unknown chemicals, contact PARKER.)

Inorganic substances	Ammonia water, ammonium, fluoride, ammonium sulfide, hydrochloric acid, phosphorous oxychloride, phosphorous trichloride, carbon bisulfide, caustic potash, nirtic acid, sodium sulfide, sulfuric acid, phosphoric acid, chromic acid, lime, sodium carbonete, sodium sulfide, potassium nitrrate, potassium bichomate, sulfate of soda, etc. Pickling water, acid defatted liquid, film processing liquid, alkaline defatted liquid, etc.
Organic substances	Acetaldehyde, acetic acid, acetone, acrylonitrile, benzene, benzoic acid, benzyl alcohol, brom benzene, butyric acid, dimethyl formamido, dioxane, ehtane tetrachloride, ethylamin, ethylenechloride, ethylene chlorlhydrin, ethylether, formic acid, phenol, propionic acid, xylene, carbon tetrachloride, chlorlbenzene, chloroform,cresol, cyclohexanon, cyclohexen, cyclohexanol, methanol, mathylmethacrylate, methylene choloride, nitrobenzene, stylene, sulfuryl chloride, tetrahydrofuran, thiophene, toluene, athylbenzene, acethylene chloride, trichloroethylene, berklene, dichrolbenzene, benzene hexachloride, methyl alcohol, ethylalcohol, carboilc acid, naphthol, methyl ether, mathyl ethylether, methyl ehtyl ketone, acetophenone, butyric acid, acrylic acid, phthalic acid, phthalic acid dimethyl, phthalic acid diethyl, phthalic dibutyl, phthalic diocutyl, glycolic acid, lactic acid, malic acid, cirtirc acid, tartaric acid, nitromethane, nitrothane, nitrorethylene, methyl amin, diothyl amin, anilin, acetanilid, acetnitryl, acrylonitrile, benzonitrile, acetolinitryl, etc. Thinner, organic solvent type detergent, agricultural chemicals, antifreezing mixture, antiseptic solution, brake fluid, aluminizing fluid, paint, synthetic fluid, rust-preventing oil, etc.
Mineral oil	Gasoline, solvent, naphtha, etc.
Others	Freon, clove oil, nutmeg oil, etc.

★The halftoned portion represents products using chemicals which may affect polycarbonate.

- Regulator
  Do not exceed maximum primary pressure rating. Product rupture can cause serious injury

DESIGN

⚠ CAUTION

- Filtering Grade
  Air filter can be classified by filtering grade as below.
  Air filter (5~40㎛)
  Coalescing filter (less than 1㎛)
  Please choose suitable filter according to condition.

DESIGN

⚠ WARNING

- Do not connect to regulator to bottled gas.

- Reversible type regulator easily flow back air with a built in mechanism to reliably and quickly discharge the secondary pressure.

- Regulator can't be used in balanced circuit and plugged outlet port.

- Internal leakage or outlet tube volume is diminished followed by air condition, the pressure is changed. Therefore it can't be used to make the pressure stable if outlet port is plugged. Contact us if you are not sure.

- Please set the secondary pressure 85% or less than primary pressure.

- Metal bowl selection
  Metal bowl should be selected in where polycarbonate bowl can't be used or in high pressure option. Contact us if you are not sure.

- Coalescing filter protection
  The element is easily closed when contaminated air flows due to small particle To prevent closing, use 5㎛ element in front of inlet port.

- Check minimum operating flow regularly. If a malfunction in minimum flow occurs, it cause trouble with the lubrication.

AIR SERVICE UNIT / PRECAUTIONS ②

Be sure to read them before use.

DESIGN

⚠ WARNING

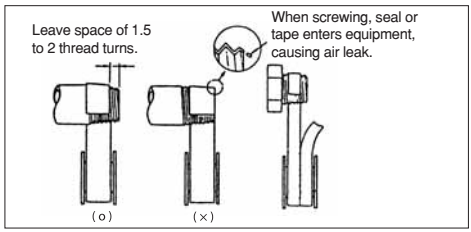
- When using a filter with automatic drain, supply air flow should be over than 50 ℓ /min(ANR) at the start of rasing pressure.

MOUNTING / PIPING

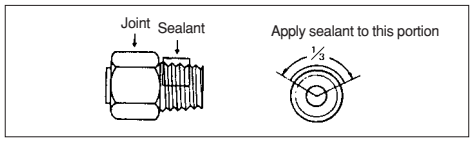
⚠ WARNING

- Before piping
  Thoroughly flush the inside of each pipe to remove chips, coolant, dust, etc, before piping.

- How to wind a seal tape
  When winding a seal tape around the threaded portion, leave space of 1.5 to 2 thread turns.



- How to apply liquid sealant
  When applying liquid sealant to the threaded portion, apply a proper amount to about 1/3 of the periphery of the threaded portion and then screw it.



MOUNTING / PIPING

⚠ CAUTION

Make sure that all debris, cutting oil, dust, etc. are removed from the piping.

When installing the products, please follow the listed torque specifications.

Bolt size	Standard thread torque(N·m)
M5	1.5 ~ 2.0
R, Rc1/8	7.0 ~ 9.0
R, Rc1/4	12 ~ 14
R, Rc3/8	22 ~ 24
R, Rc1/2	28 ~ 30
R, Rc3/4	28 ~ 30
R, Rc1	36 ~ 38
R, Rc1-1/4	40 ~ 42
R, Rc1/2	48 ~ 50

- Air filter, lubricator installation
  Bowl locates in downward then assemble with vertical direction. If it is assembled in wrong direction, filtering or lubricating can't be operated properly.

- Filter with piston drain installation
  Piston drain is worked by pressure drop of solenoid valve operation. Install the filter near solenoid valve within 50cm.

- Air flow in air filter
  Connect followed by marking on the body. If it is connected opposite, proper filtering can't be got.

- Air flow in regulator
  Connect followed by marking on the body. If it is connected opposite, pressure can't be adjusted due to air leakage.

- Air flow in lubricator
  Connect followed by marking on the body. If it is connected opposite, few amount of air flows then poor lubricating is operated

- Drain
  If condensate in the drain bowl is not emptied on a regular basis, the bowl will over flow and allow the condensate to enter the compressed air lines. If the drain bowl is difficult to check and remove, it is recommended that a drain bowl with the auto-drain option be installed.

- Drain
  Be sure not to being erased part number on label by solvent.

AIR SERVICE UNIT / PRECAUTIONS ③

Be sure to read them before use.

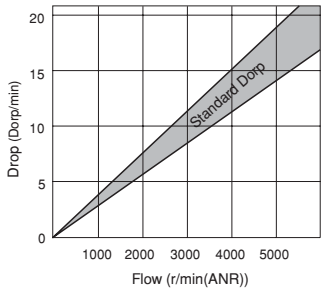
DESIGN

⚠ WARNING

- When the adjusting knob of a regulator and integral filter-regulator is turned clockwise, pressure rises.
  When this knob is turned counterclockwise, pressure drops.
  When setting pressure, do so in the direction of pressure rise.

- Oil flow adjustment
  - Lubricator oil flow adjustment is done by turning the adjustment knob.
  - Oil flow is increased in counterclockwise and decreased in clockwise.
  - Adjust knob followed by oil flow through sight dome.
  - No oil flow if air doesn't flow.

- Adjust oil flow when air flows in the system
  - Referring to below graph, adjust flow rate by its application.



MAINTENANCE

⚠ WARNING

- Drain out the filter periodically.

- Use turbine oil class 1(ISO VG32) or equivalent as a lubricant for LUBRICATOR.
  Do not use spindle oil and machine oil, because they may corrode the plastic parts and O-ring.

- When washing the sight glass of the bowl and lubricator, be sure to use a detergent.

- Change the filter element before pressure drops below

Part	Pressure drop
Air Filter	0.05MPa
Coalescing Filter	0.07MPa

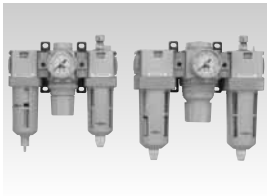
- Shunt-down before maintenance.
  Before attempting any kind of maintenance make sure the supply pressure is shut off and all residual air pressure is released from the system to be worked on.

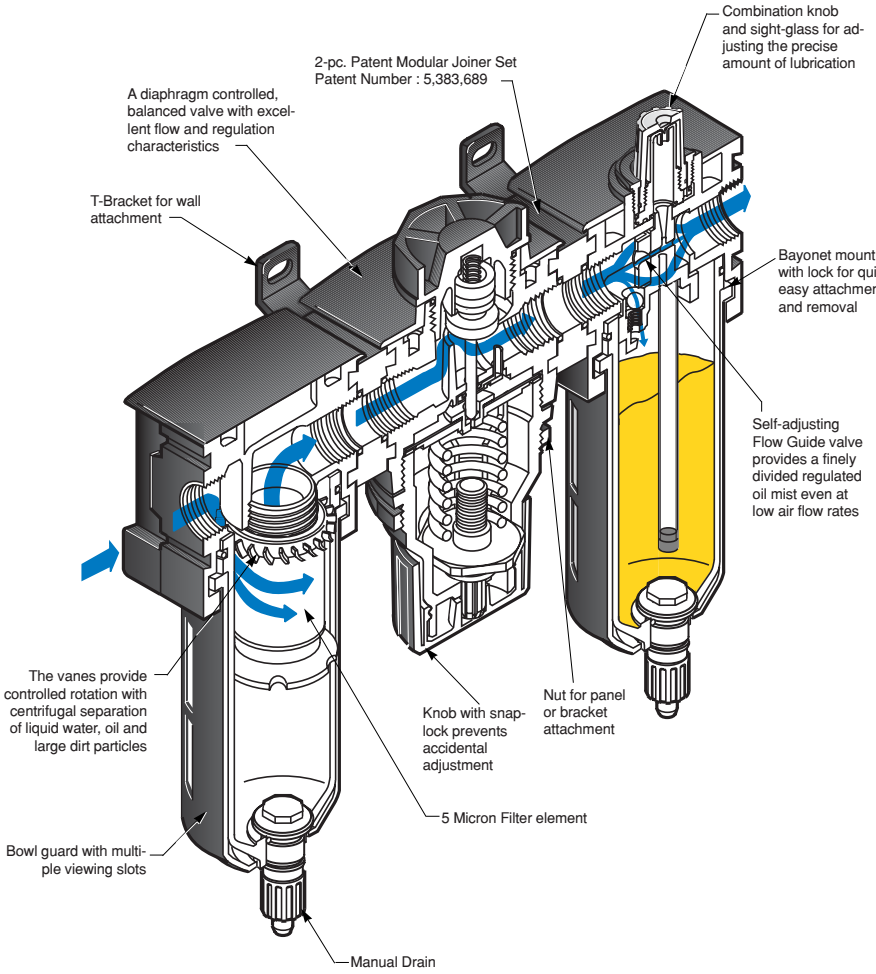
- Bowl assembly
  Be sure to bowl is assembled with body firmly and whether the mark on bowl guard and bowl is same direction or not. If it is assembled wrongly, human can be damaged by blowing bowl after supplying compressed air.

- To assemble/disassemble element, grab end plate not to being touched in polyurethane cover. Polyurethane can be damaged by touching.

Parker
Pneumatic

Air Service Unit
AC Series

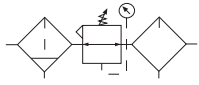



Combination knob and sight-glass for adjusting the precise amount of lubrication
2-pc. Patent Modular Joiner Set Patent Number : 5,383,689
A diaphragm controlled, balanced valve with excellent flow and regulation characteristics
T-Bracket for wall attachment
Bayonet mount with lock for quick easy attachment and removal
Self-adjusting Flow Guide valve provides a finely divided regulated oil mist even at low air flow rates
The vanes provide controlled rotation with centrifugal separation of liquid water, oil and large dirt particles
Knob with snap-lock prevents accidental adjustment
Nut for panel or bracket attachment
5 Micron Filter element
Bowl guard with multiple viewing slots
Manual Drain

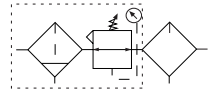
Modular type Air Service Uni

AC,AD Series

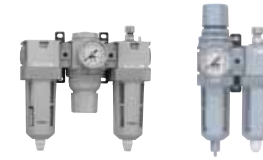
Symbol



F+R+L 3 Combo.



FR+L 2 Combo.



Order Key

AC **18** – **T** **3** – **F** **K** **G** **0**

Series

AC	F+R+L 3 Combo.
AD	FR+L 2 Combo.

Body size

08	1/8",1/4"
18	1/4",3/8",1/2"
28	3/8",1/2",3/4"

Thread Type

T	Rc(PT)
0	NPT
C	BSPP[1]

Port Size

		08	18	28
1	1/8"	•	–	–
2	1/4"	•	•	–
3	3/8"	–	•	•
4	1/2"	–	•	•
6	3/4"	–	–	•

Pressure range and seal

Function	Seal	0~0.4MPa (0~4.1 bar)	0~0.86MPa (0~8.6 bar)	0~1.72MPa[3] (0~17.2 bar)
Relieving	NBR	D	F	G
	Fluorocarbon	K	L	M
Non-Relieving	NBR	W	R	S
	Fluorocarbon	X	Y	Z

Bowls / Drains

Drain	Bowls	
	Plastic bowl	Metal bowl[2]
Auto Drain[3]	G	H
Manual Drain	K	L
Piston Drain	R	S

※Piston drain is available only 08 Series

Option 1

0	None
M	Round gauge for 08 Series
E	Square gauge for 08 Series
G	Round gauge for 08/28 Series
L	DPI gauge[3]
V	Fluorocarbon[4]

※Note) When selecting from the options columns, please enter letters in alphabetical.

Option 2

0	None
M	Round gauge for 08 Series
E	Square gauge for 08 Series
G	Round gauge for 08/28 Series
L	DPI gauge[3]
V	Fluorocarbon[4]

1. ISO, R228(G Series)
2. Sight gauge is not available at 08 Series
3. 08 Series is not sight gauge
4. Except lubricator

Modular Type Air Sevice Unit

Specification

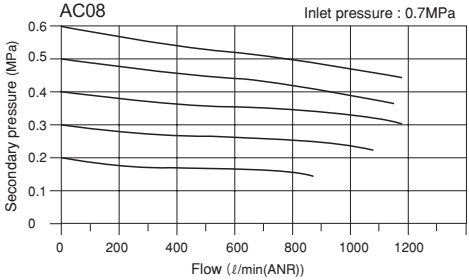
AC08, 18, 28

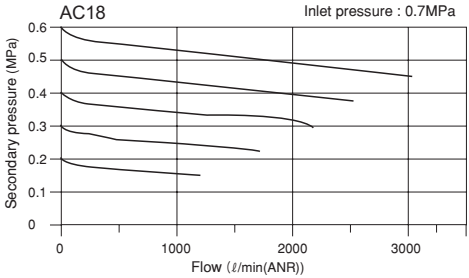
Item		Unit	AC08		AC18			AC28		
Port size			1/8"	1/4"	1/4"	3/8"	1/2"	3/8"	1/2"	3/4"
Gauge port size			1/8"		1/4"			1/4"		
Fluid			Air							
Filtration		㎛	5							
Max. Operating pressure	Plastic bowl	MPa(bar)	0.86 (8.6)							
	Metal bowl		1.72 (17.2)							
Max. Operating temperature	Plastic bowl	℃	52.0							
	Metal bowl		65.5							
Useful retention(Filter)		cm^3	12		51			85		
Useful retention(Lubricator)		cm^3	18		121			181		
Min. Operating flow		ℓ/min(ANR)	20		30			40		
Suggested lubricant			Turbine oil(ISO VG32)							
Weight		kg	0.46		1.29			1.84		

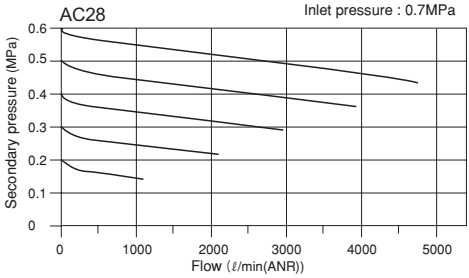
AD08, 18, 28

Item		Unit	AD08		AD18			AD28		
Port size			1/8"	1/4"	1/4"	3/8"	1/2"	3/8"	1/2"	3/4"
Gauge port size			1/8"		1/4"			1/4"		
Fluid			Air							
Filtration		㎛	5							
Max. Operating pressure	Plastic bowl	MPa(bar)	0.86(8.6)							
	Metal bowl		1.72(17.2)							
Max. Operating temperature	Plastic bowl	℃	52.0							
	Metal bowl		65.5							
Useful retention(Filter)		cm^3	12		51			85		
Useful retention(Lubricator)		cm^3	18		121			181		
Min. Operating flow		ℓ/min(ANR)	20		30			40		
Suggested lubricant			Turbine oil(ISO VG32)							
Weight		kg	0.35		1.03			1.51		

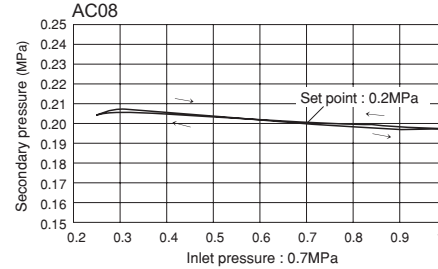
Flow characteristics

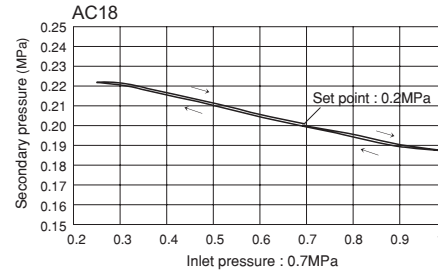


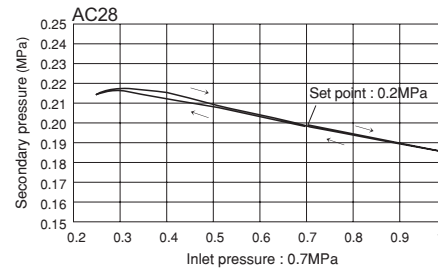




Pressure characteristics





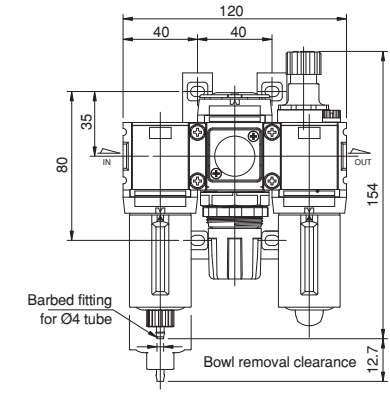


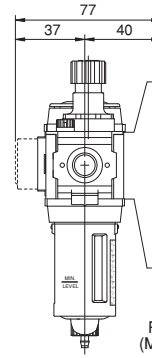
Modular Type Air Sevice Unit

Dimension

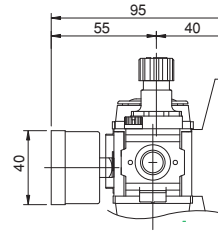
(Unit : mm)

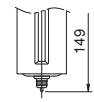
AC08



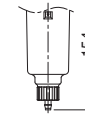


Plastic bowl
(Manual drain)

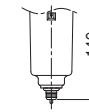




Plastic bowl
(Piston drain)

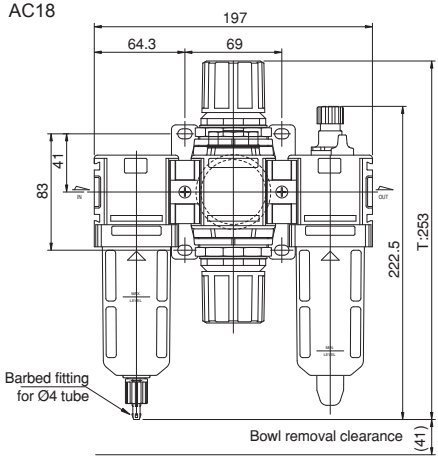


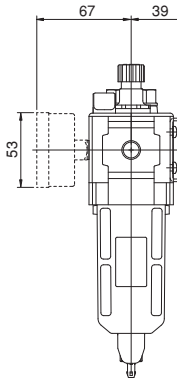
Metal bowl
(Manual drain)



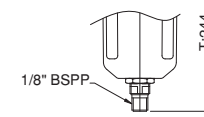
Metal bowl
(Piston drain)

AC18

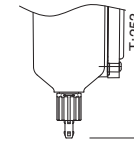




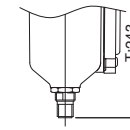
Plastic bowl
(Manual drain)



Plastic bowl
(Auto drain)



Metal bowl
(Manual drain)

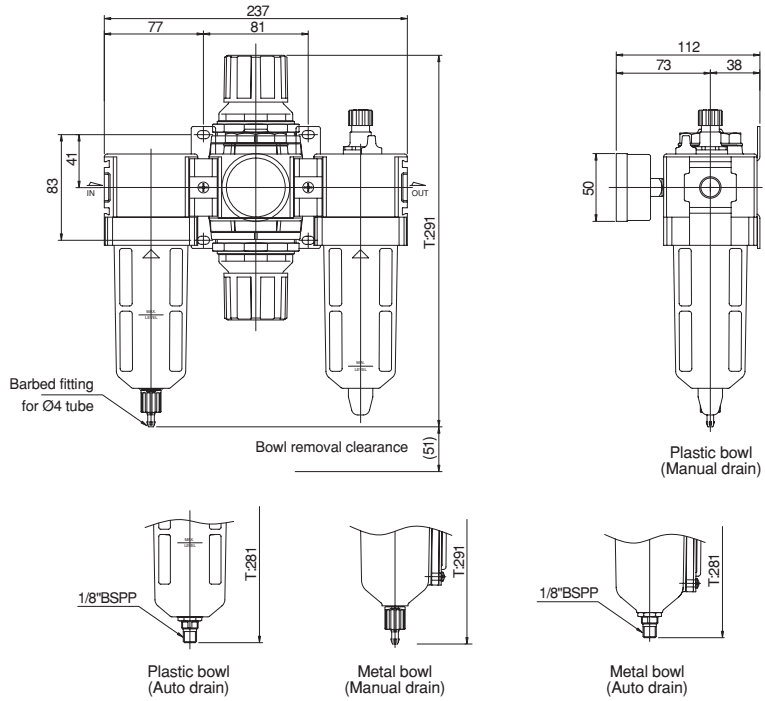


Metal bowl
(Auto drain)

Dimension

(Unit : mm)

AC28

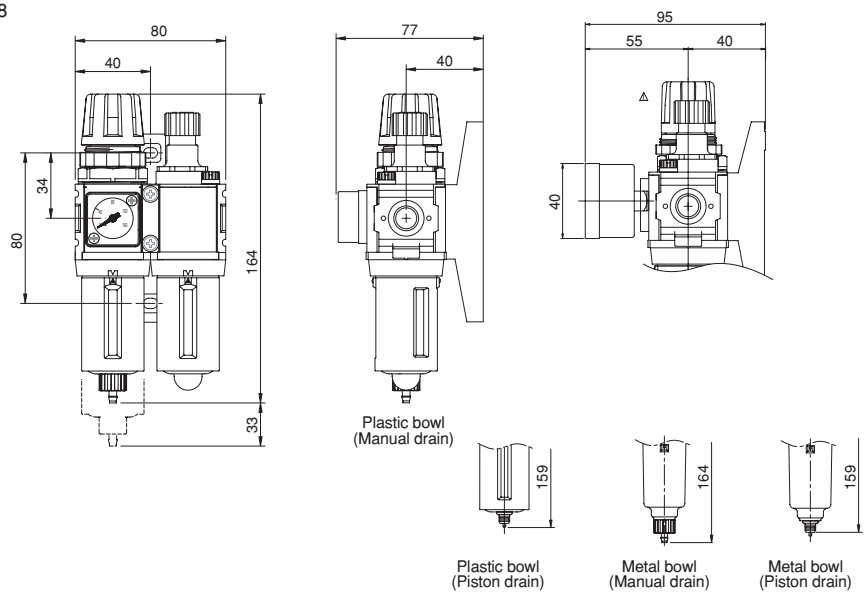


Modular Type Air Sevice Unit

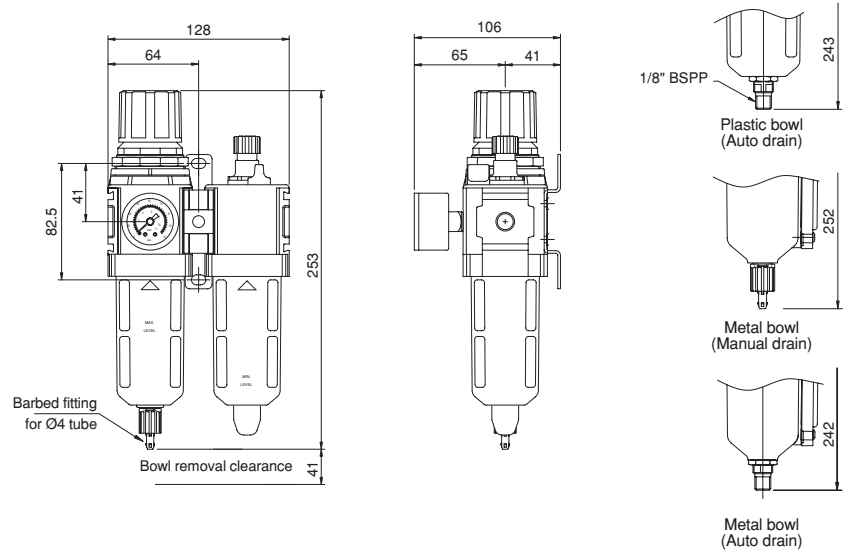
Dimension

(Unit : mm)

AD08



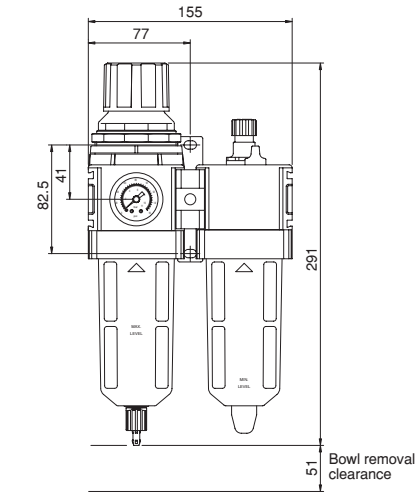
AD18

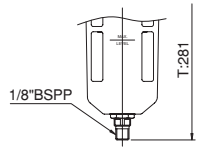


Dimension

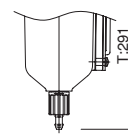
(Unit : mm)

AD28

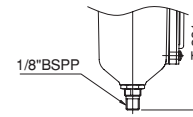




Plastic bowl
(Auto drain)



Metal bowl
(Manual drain)

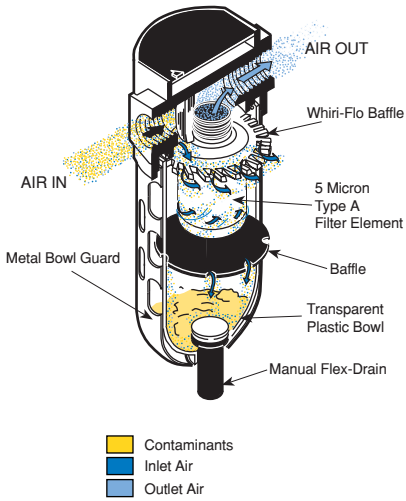


Metal bowl
(Auto drain)

Particulate Filters

For the removal of solid particle contaminants down to 5 microns and the separation of bulk liquids.

This type of filter is generally used in industrial applications where liquid water and oil, and harmful dirt particles must be removed from the compressed air system. This type of filter should also be used as a prefilter for the Coalescing (oil removal) filter.



Operation

Wet and dirty inlet air is directed downward and outward in a circular pattern by the turbine-shaped upper baffle. This downward and outward in a circular pattern by the turbine-shaped upper baffle.

This action mechanically separates a large amount of the liquid and gross particles, which then flow down the inside of the bowl, past the lower baffle, into the quiet zone to be drained away. The quiet zone baffle prevents the contaminants from reentering the air flow stream.

The partially cleansed air then passes through the filter element. By utilizing depth filtration, the 5micron filter media provides superior filtration, exceptional service life and minimum pressure drop.

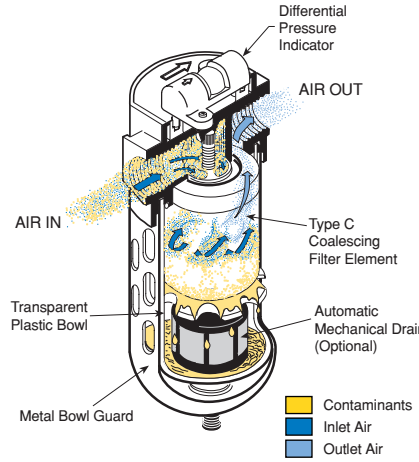
Coalescing Filter(Oil Removal)

Specifically designed for the removal of solid particles, water and oil aerosols down to 0.01micron. Maximum remaining oil content of air leaving the filter down to 0.01ppm at 21 C at a pressure of 6.9 bar using a typical compressor lubricant. Two filter element grades are offered to better meet your air quality requirements.

Grade B and B1 filter elements are used for most air coalescing applications where the removal of liquid aerosols and submicronic particles for general air quality is required.

Protection of components such as air valves, cylinders, as well as air conveyors, air gaging, air bearings, air control circuits and paint spraying equipment are examples of specific end-use applications. This grade of filter element should be used as a prefilter for the Grade C coalescing filter.

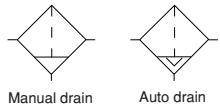
Grade C high-efficiency filter elements are used where the removal of extremely fine particulate and virtually "oil-free" or high quality air is necessary. Specific end-use applications are protection of critical air control circuits, air control circuits, air logic systems, flow and temperature controllers, food processing, electronics, health care and film processing. This grade of filter element should be used as a prefilter for the Grade D oil vapor removal filter.

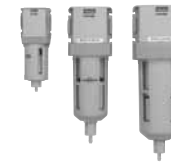


Air Filter

AF08, 18, 28 Series

Symbol





Order Key

AF 18 – T 3 – S K 0 0

Series

AF	Air Filter

Body size

08	1/8",1/4"
18	1/4",3/8",1/2"
28	3/8",1/2",3/4"

Thread Type

T	Rc(PT)
0	NPT
C	BSPP[2]

Port Size

		08	18	28
1	1/8"	●	–	–
2	1/4"	●	●	–
3	3/8"	–	●	●
4	1/2"	–	●	●
6	3/4"	–	–	●

Filter Element

S	5㎛

Bowls / Drains

Drain \ Bowls	Plastic bowl	Metal bowl[3]
Auto Drain[1,4]	G	H
Manual Drain	K	L
Piston Drain	R	S

※Piston drain is available only 08 Series

Option 1

0	None
L	Differential pressure indicator[1]
V	Fluorocarbon seal

Option 2

0	None
L	Differential pressure indicator[1]
V	Fluorocarbon seal

※Note) When selecting from the options columns, please enter letters in alphabetical.

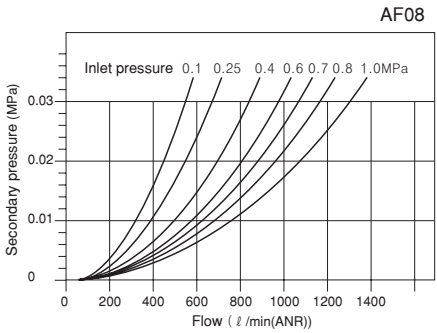
1. 08 Series is not sight gauge
2. ISO, R228(G Series)
3. Sight gauge is not available at 08 Series
4. Operating pressure range 1~14 bar

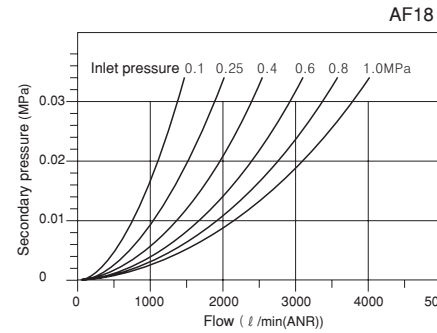
Air Filter

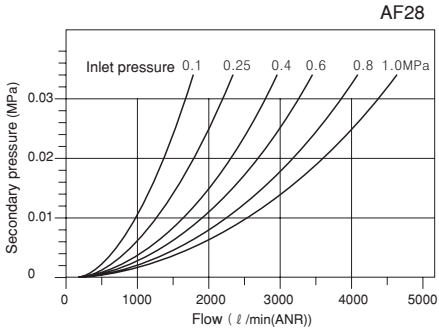
Specification

Item		Unit	AF08		AF18			AF28		
Port size			1/8"	1/4"	1/4"	3/8"	1/2"	3/8"	1/2"	3/4"
Fluid			Air							
Filtration		μm	5							
Max. Operating pressure	Plastic bowl	MPa(bar)	1.03(10.3)							
	Metal bowl		1.72(17.2)							
Max. Operating temperature	Plastic bowl	℃	52.0							
	Metal bowl		65.5							
Useful retention(Filter)		cm^3	12		51			85		
Weight		kg	0.11		0.28			0.46		

Flow characteristics

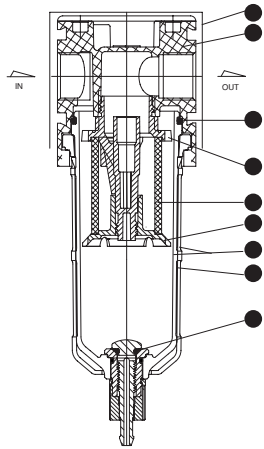


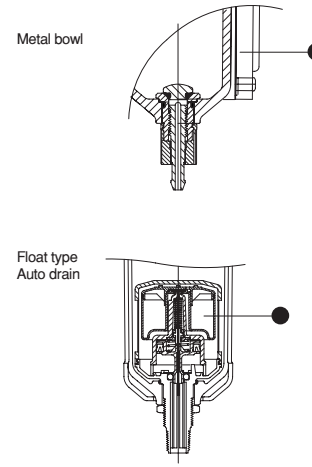




Constructions

(Unit : mm)





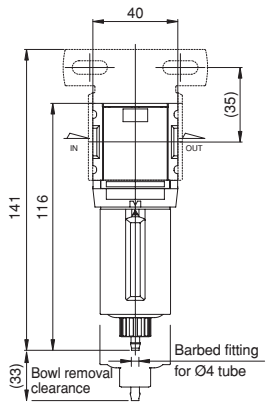
No.	Parts		Part No.			Material
			AF08	AF18	AF28	
1	Body		–	–	–	AL Alloy
2	Body cover		–	–	–	Plastic
3	Deflector		–	–	–	Plastic
4	Filter element (5 Micron)		AFRP-96-729	AFRP-96-639	AFRP-96-653	Polyethylene
5	Baffle		N/A	AFRP-96-641	AFRP-96-283	Plastic
6	Bowl O-ring		GRP-96-710	GRP-96-640	GRP-96-654	Nitril
	Bowl O-ring(Fluorocarbon)		GRP-96-711	GRP-96-754	GRP-96-755	Fluorocarbon
7	Plastic bowl Ass'y	Manual drain	AGRP-96-712	AGRP-96-634	AGRP-96-642	Nitril
		Auto drain[1]	N/A	AGRP-96-635	AGRP-96-643	
8	Manual drain Ass'y		N/A	AGRP-96-685	AGRP-96-685	Nitril
9	Bowl Guide		–	–	–	Nylon
10	Auto drain Ass'y		GRP-96-716	GRP-96-200	GRP-96-200	Nitril
11	Metal bowl	Manual drain	AGRP-96-714	AGRP-96-636	AGRP-96-644	Nitril
		Auto drain[1]	N/A	AGRP-96-637	AGRP-96-645	

Note 1) In case of 08 Series is Piston type drain.

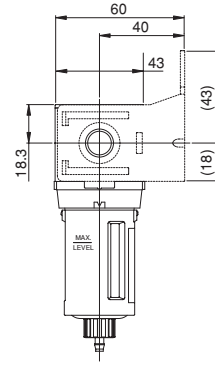
Dimension

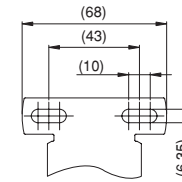
(Unit : mm)

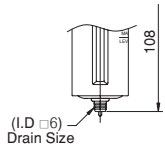
AF08



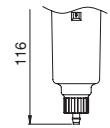
Plastic bowl
(Manual drain)



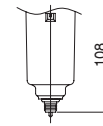




Plastic bowl
(Piston drain)



Metal bowl
(Manual drain)

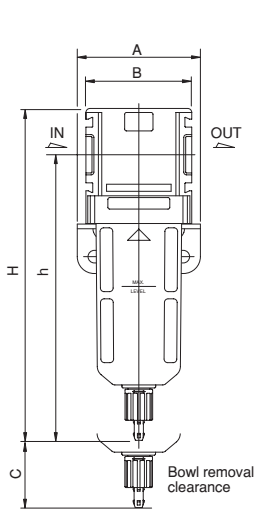


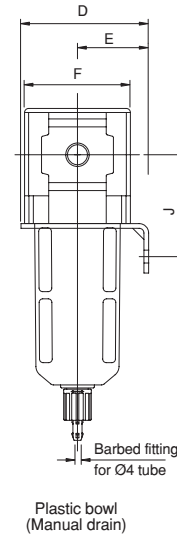
Metal bowl
(Piston drain)

Dimension

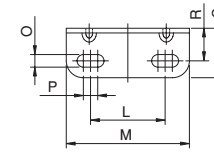
(Unit : mm)

AF18 / 28

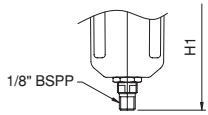




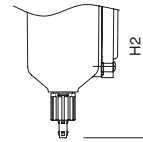
Plastic bowl
(Manual drain)



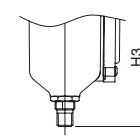
Plastic bowl
(Auto drain)



Metal bowl
(Manual drain)



Metal bowl
(Auto drain)

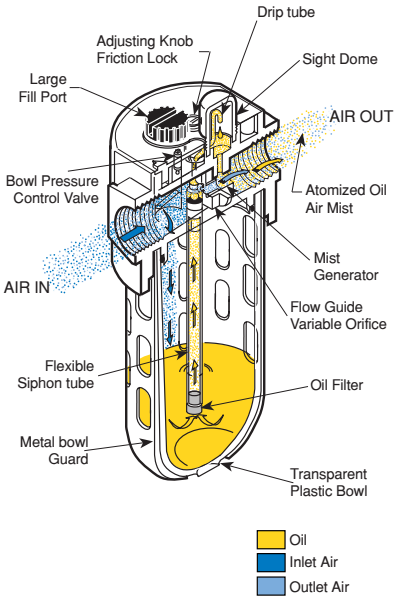


Series	A	B	C	D	E	F	H	h	H1	H2	H3	J	L	M	O	P	R	S
AF18	69.5	60	41	72	40	60	188	161	179	187	178	57.5	42	69.5	7	8	18.5	28
AF28	76	73	51	87	50	73	213	187	204	213	204	64	48	76	7	8	18.5	28

LUBRICATORS

EconOmist™

EconOmist™ lubricators inject an oil aerosol into the flowing air stream to automatically provide the proper amount of internal lubrication to air operated tools or other pneumatic devices.



Operation

For proper operation there must be line pressure in the reservoir bowl. As the air flows through the lubricator, some of the incoming air passes through the bowl pressure control valve that then pressurizes the bowl pushing oil upward through the siphon tube. Most of the air flow passes through the self-adjusting Flow-Guide flow sensor in the lubricator throat creating a sight pressure drop that is proportional to the rate of air flow. The pressure drop is sensed by the sight dome and across the adjustment needle valve allowing oil to flow upward through the siphon tube into the sigth dome where it drips into a nozzle passage and then into the lubricator throat.

The precise amount of oil to be delivered to the air stream is determined by the oil adjusting needle valve that sets the exact drip rate. The oil drops are atomized by the high velocity air flowing through the lubricator. All of the drops visible in the sight dome are delivered downstream to the air devices.

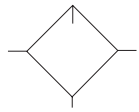
The self-adjusting flow sensor automatically maintains a constant oil-to-air ratio by opening and closing in response to a wide range of changing air flows. A check valve keeps the siphon tube full of oil during periods of no flow and prevents oil carryover due to the possibility of reverse flow.

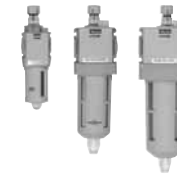
The pressurizing valve controls the rate of bowl pressurization and allows depressurization for refilling the unit without shutting off the supply air. When the oil fill plug is loosened, a spring loaded, normally closed 2-way valve closes, allowing the air pressure in the bowl to be gradually reduced. When the fill plug is replaced, the bowl repressurizes through the pressure control valve. Upon initial use, or if unit has been run dry, open oil adjustment wide open until no air bubbles are visible in sight dome. Then, reset oil feed adjustment to desired setting.

Lubricator

AL08, 18, 28 Series

Symbol





Order Key

AL 18 – T 3 – K C 0 0

Series

AL	Lubricator

Body size

08	1/8",1/4"
18	1/4",3/8",1/2"
28	3/8",1/2",3/4"

Thread Type

T	Rc(PT)
0	NPT
C	BSPP[1]

Port Size

		08	18	28
1	1/8"	•	–	–
2	1/4"	•	•	–
3	3/8"	–	•	•
4	1/2"	–	•	•
6	3/4"	–	–	•

Bowls / Drains

Drain	Bowls	
	Plastic bowl	Metal bowl[2]
None	C	D

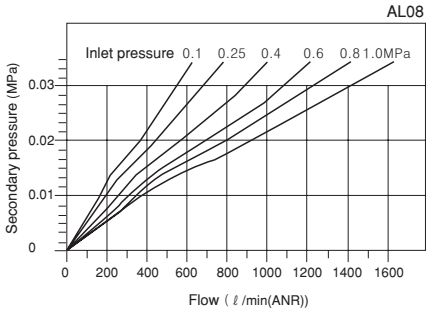
1. ISO, R228(G Series)
2. Sight gauge is not available at 08 Series

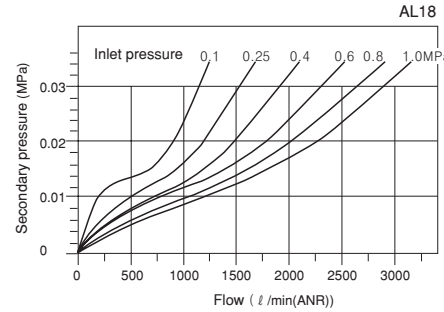
Lubricator

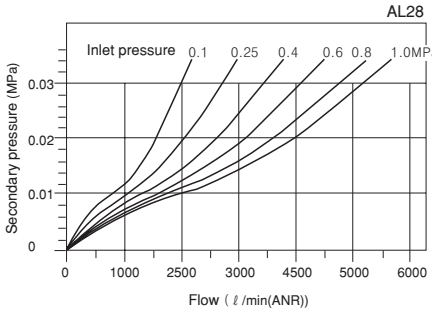
Specification

Item		Unit	AL08		AL18			AL28		
Port size			1/8"	1/4"	1/4"	3/8"	1/2"	3/8"	1/2"	3/4"
Fluid			Air							
Min. Operating flow		l/min(ANR)	20		30			40		
Max. Operating pressure	Plastic bowl	MPa(bar)	1.0(10.3)							
	Metal bowl		1.7(17.2)							
Max. Operating temperature	Plastic bowl	℃	0~52.0							
	Metal bowl		0~65.5							
Useful retention(Lubricator)		cm^3	18		121			181		
Weight		kg	0.13		0.31			0.47		

Flow characteristics

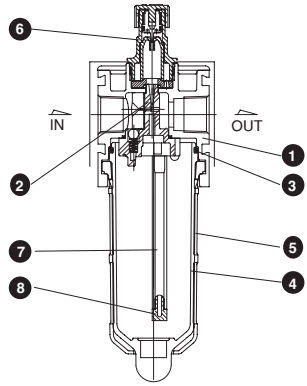


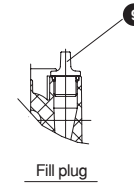


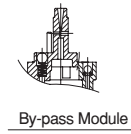


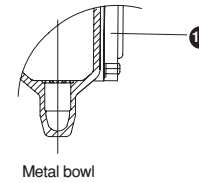
Constructions

(Unit : mm)









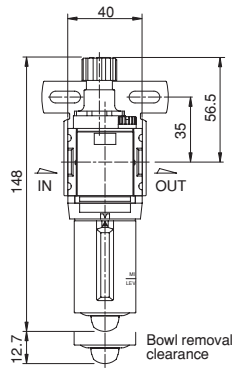
No.	Parts		Part No.			Material
			AL08	AL18	AL28	
1	Body					AL Alloy
2	By-pass module		N/A	ALRP-96-678	ALRP-96-678	Plastic
3	Bowl O-ring	NBR	GRP-96-710	GRP-96-640	GRP-96-654	Nitril
		Fluorocarbon	GRP-96-711	GRP-96-754	GRP-96-755	Fluorocarbon
4	Plastic bowl Ass'y		ALRP-96-736	ALRP-96-701	ALRP-96-702	Polycarbonate
5	Bowl Guide					Nylon
6	Sight dome Ass'y		ALRP-96-301	ALRP-96-301	ALRP-96-301	Polycarbonate
7	Siphon tube		ALRP-96-731	ALRP-96-677	ALRP-96-681	Polyurethane
8	Filter					Sintered Bronze
9	Fill Plug		ALRP-96-730	ALRP-96-679	ALRP-96-679	Plastic
10	Metal bowl Ass'y		AGRP-96-714	AGRP-96-636	GRP-96-654	

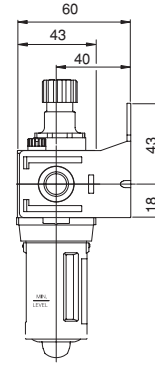
Lubricator

Dimension

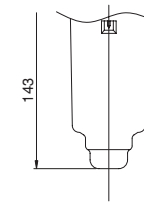
(Unit : mm)

AL08

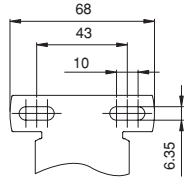




Plastic bowl
(Manual drain)



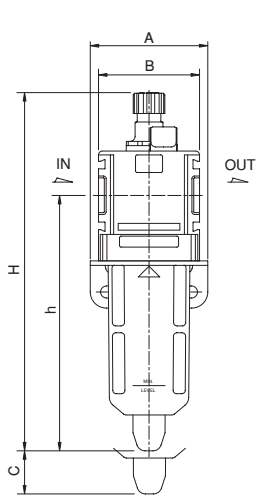
Metal bowl
(Manual drain)

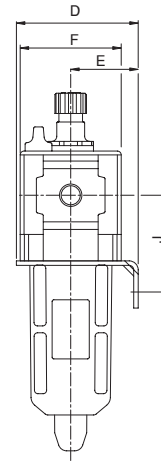


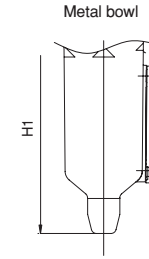
Dimension

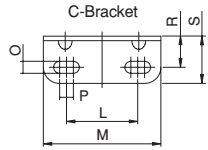
(Unit : mm)

AL18 / 28







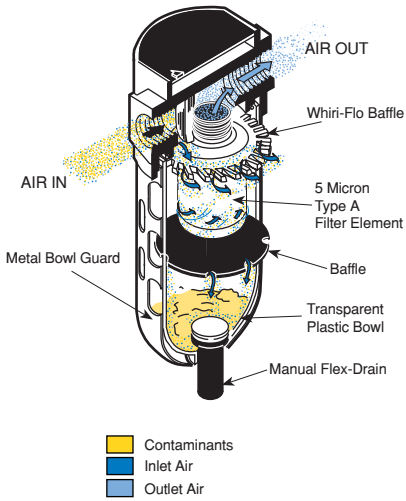


Series	A	B	C	D	E	F	H	h	H1	J	L	M	O	P	R	S
AL18	70	60	48	70	40	60	212	151	208	57.5	42	70	7	8	18.5	28
AL28	76	73	61	87	50	73	238	177	238	64	48	76	7	8	18.5	28

Particulate Filters

For the removal of solid particle contaminants down to 5 microns and the separation of bulk liquids.

This type of filter is generally used in industrial applications where liquid water and oil, and harmful dirt particles must be removed from the compressed air system. This type of filter should also be used as a prefilter for the Coalescing (oil removal) filter.



Operation

Wet and dirty inlet air is directed downward and outward in a circular pattern by the turbine-shaped upper baffle. This downward and outward in a circular pattern by the turbine-shaped upper baffle.

This action mechanically separates a large amount of the liquid and gross particles, which then flow down the inside of the bowl, past the lower baffle, into the quiet zone to be drained away. The quiet zone baffle prevents the contaminants from reentering the air flow stream.

The partially cleansed air then passes through the filter element. By utilizing depth filtration, the 5micron filter media provides superior filtration, exceptional service life and minimum pressure drop.

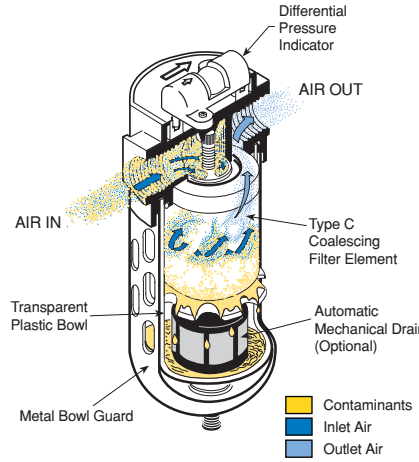
Coalescing Filter(Oil Removal)

Specifically designed for the removal of solid particles, water and oil aerosols down to 0.01micron. Maximum remaining oil content of air leaving the filter down to 0.01ppm at 21 C at a pressure of 6.9 bar using a typical compressor lubricant. Two filter element grades are offered to better meet your air quality requirements.

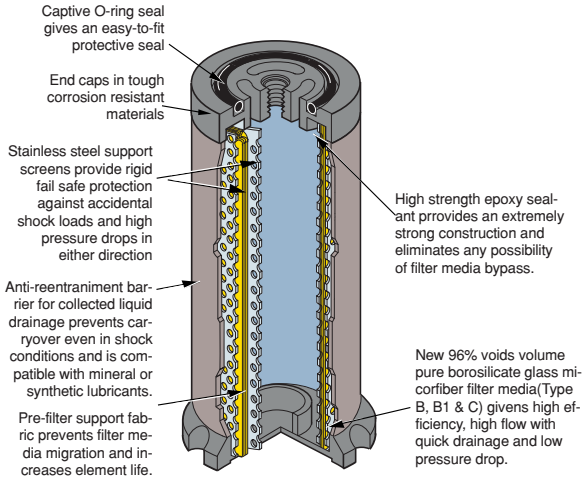
Grade B and B1 filter elements are used for most air coalescing applications where the removal of liquid aerosols and submicronic particles for general air quality is required.

Protection of components such as air valves, cylinders, as well as air conveyors, air gaging, air bearings, air control circuits and paint spraying equipment are examples of specific end-use applications. This grade of filter element should be used as a prefilter for the Grade C coalescing filter.

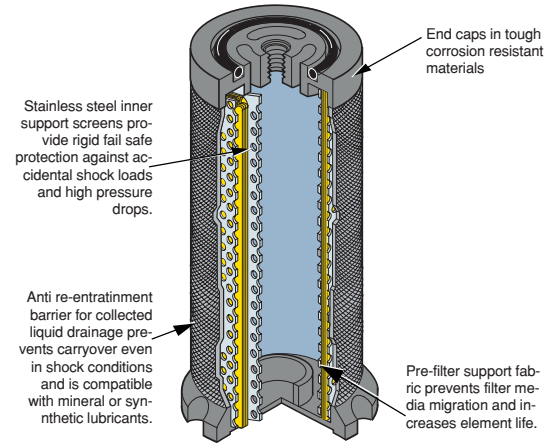
Grade C high-efficiency filter elements are used where the removal of extremely fine particulate and virtually "oil-free" or high quality air is necessary. Specific end-use applications are protection of critical air control circuits, air control circuits, air logic systems, flow and temperature controllers, food processing, electronics, health care and film processing. This grade of filter element should be used as a prefilter for the Grade D oil vapor removal filter.



Coalescing Elements Features and Benefits Type B, B1 & C



B1, C Element



B Element

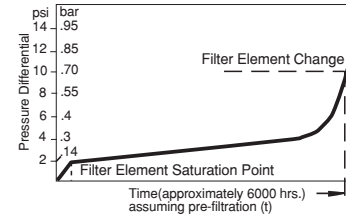
How The Elements Work

Using the principles of mechanical filtration, the filter media removes the solid particles first in the pre-filter support layers and then in the actual filter media. These paritiicles remain permanently Trapped and gradually cause an increase in pressure drop. The liquid particles similarly collected coalesce together forming larger droplets and as the flow is inside to out, are pushed to the outer surface.

Here, the anti-reentrainment barrier prevents them from being introduced back into the air stream and instead drains them through its cellular structure to the bottom of the element. The resultant "wet-band" on the bottom of the element, in presenting a high pressure drop area, ensures that the filtered air passes through the upper portion of the element. This creates a "quiet zone" in the bottom of the filter through which the liquid falls to the bottom of the filter bowl and is drained away via the automatic drain.

As mentioned earlier, solid particles cause the pressure drop to slowly increase throughout the working life. Initially, during the period to reach an equilibrium saturation, as determined by the upstream liquid contamination concentration, the pressure drop rises sharply as shown above. This is a typical pressure drop verses time characteristic for a coalescing filter. The end of useful and economic service life is indicated by an accelerating increase in pressure drop. The element should be replaced every 12 months or 6000 working hours under normal working conditions.

TYPICAL COALESCING ELEMENT LIFE CURVE



Adsorption Elements Features and Benefits Type D

How The Elements Work

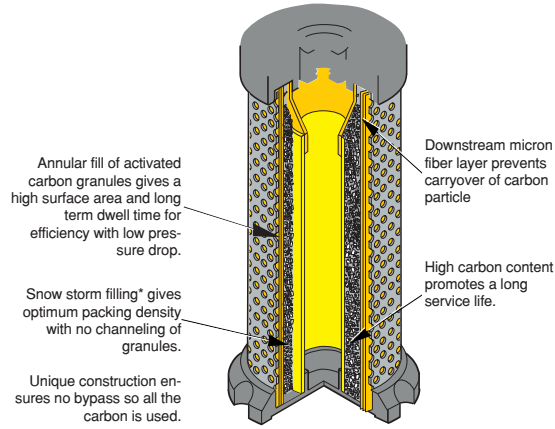
While mechanical filtration employing the Type C element is capable of removing extremely fine liquid or solid particles even as small as 0.01 micron it cannot remove gaseous contaminants such as oil vapor or odors. To do this we must employ the physical phenomena of adsorption. Activated carbon, having an affinity for oil vapor molecules and with an extremely high surface area, created by its capillary structure, is used for this.

Parker activated carbon elements are designed to maximize the adsorption properties of the carbon. This is achieved by first passing the air through carbon granules, snow storm filled* into either an annular space or tubular section. The granules provide an extremely high surface area to volume and when arranged in a deep bed that increases dwell time gives the benefit of both efficiency and service life. After being passed through the carbon, the air goes through a layer of microfiber to prevent migration of fine carbon particles downstream.

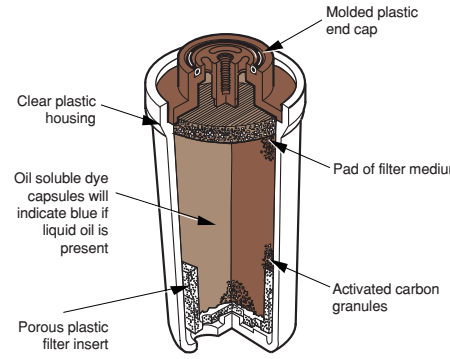
Adsorption elements have a limited life and this is affected by many factors but principally temperature. Obviously, the higher the inlet temperature, the more oil Vapor there is present, for example at 40℃ there is more than ten times the oil vapor than at 21℃ . For this reason, activated carbon filters are best installed at the lowest possible system temperature. The type C filter should always precede a Type D filter.

The typical life of an adsorption element is in the region of 1000-2000 hours at 21 ℃. Filtration temperature is based on tests carried out on a Chlorobenzene test rig, however, this is best determined in practice by a routine "odor" check.

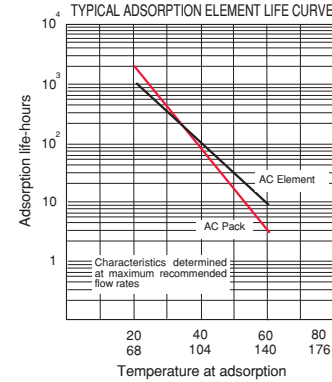
Oil vapor has a distinct odor. The least expensive and very effective way to check for oil vapor getting through the filter is to install a small bleed vale downstream. Periodically crack this valve and smell the air. The human nose is extremely sensitive to oil vapor and at the first hint of this odor, change the element.



D Element(AC Element)



D Element(AC Pack)



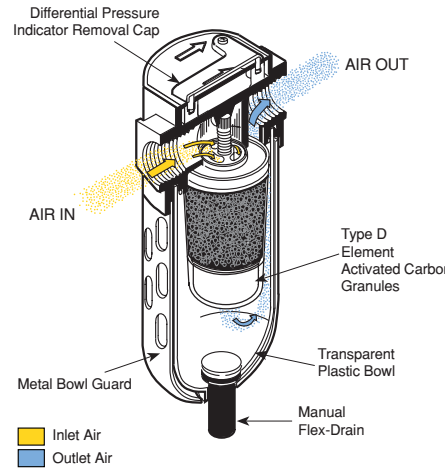
Operation

The filter element design utilizes a borosilicate micro fiber that provides superior filtration efficiency, quick draining and minimum pressure drop. Unlike standard particle filters, air flow is inside to out. The compressed air/gas passes through the inner layer of the filter element which acts as an integral pre-filter to remove large contaminants. This gives protection to the layer of high efficiency filter material which substantially removes submicronic aerosols and solids from the air flow stream. Solid particles are permanently trapped within the filter media.

The fine liquid particles, including aerosols, after initially being trapped by the fibers of the filter media, begin to collect or coalesce forming larger droplets. These droplets, along with other large droplets present, are pushed to the outer surface. Here, the anti-reentrainment barrier collects the droplets as they break free from the micro fiber and allow them to gravitate within its cellular structure forming a "Wet band" around the bottom of the element.

Clean filtered air/gas passes through the anti-reentrainment barrier above the "wet-band" where the resistance to flow is less, leaving a quiet zone of no air/gas movement in the bottom of the filter housing.

The separated liquid drops from the bottom of the filter element and falls through the quiet zone, without being reentrained, to the bottom of the filter housing where it by a drain.



Oil Vapor Filter

Activated carbon element for the removal of oil vapor and oil associated odors. Maximum remaining oil content of air leaving the filter is 0.003 ppm at 21℃ at a pressure of 6.9 bar. For the Grade D filter element, two types of designs are used depending on the size and flow capacity of the filter housing.

An oil vapor filter is used, in conjunction with a Grade C filter element, where the application requires very high air quality. Typical applications are food processing and packaging, pharmaceutical, fermentation, electronics and semiconductor, and critical air control.

Operation

While the Grade B, B1 and C filter elements can remove extremely fine liquid and solid particles, they cannot remove gaseous contaminants such as oil vapor or odors. To do this you must employ the physical phenomena of adsorption.

Activated carbon, having an affinity for oil vapor molecules and with an extremely high surface area, created by its capillary structure, is used.

Our activated carbon Grade D filter elements are designed to maximize the adsorption properties of the carbon.

This is achieved by first passing the air through carbon granules located either in an annular space or tubular section. The granules provide a very high ratio of surface area to volume, and when arranged in a deep bed, increases the dwell time of the air flow. This type of design provides the benefit of both high efficiency and longer service life of the activated carbon.

Differential Pressure Indicator (DP2, DP8)

The Parker direct mounting Differential Pressure Indicator is equipped standard on most Coalescing Filter models. It provides a maintenance free means of determining the service life of the filter element With a new filter the indicator shows all green, and progresses to a full red indication a 0.5 bar. indicating the element should be changed. The magnified indicator can be easily seen from the top or either side of the filter, and with only one moving part will provide reliability and long life.

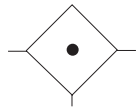
The Differential Pressure Indicator cannot be retrofitted to Parker filters ordered without it. It is available as repacement accessory kit.

Note : The maximum operating pressure for metal or plastic bowls with this Indicator is 10 bar. The maximum operating temperature is 65℃ for metal bowls and 51℃ for plastic bowls.

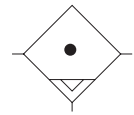
Coalescing Filte

AM08, 18, 28 Series

Symbol



Manual drain



Auto drain

Order Key

AM **18** – **T** **3** – **C** **K** **0** **0**

Series

AF	Air Filter

Body size

08	1/8",1/4"
18	1/4",3/8",1/2"
28	3/8",1/2",3/4"

Thread Type

T	Rc(PT)
0	NPT
C	BSPP[2]

Port Size

		08	18	28
1	1/8"	•	–	–
2	1/4"	•	•	–
3	3/8"	–	•	•
4	1/2"	–	•	•
6	3/4"	–	–	•

Filter Element

B	0.5㎛
C	0.01㎛
D	0.003㎛ Activated Carbon[3]

Bowls / Drains

Drain \ Bowls	Plastic bowl	Metal bowl[4]
Auto Drain[1,4]	G	H
Manual Drain	K	L
Piston Drain	R	S

※Piston drain is available only 08 Series

Option 1

0	None
L	DPI gauge[1]
V	Fluorocarbon seal

※Note) When selecting from the options columns, please enter letters in alphabetical.

Option 2

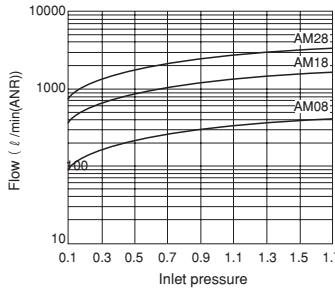
0	None
L	DPI gauge[1]
V	Fluorocarbon seal

1. 08 Series is not available
2. ISO, R228(G Series)
3. If ordering bowl drains option, only K and L bowl are available.
4. Sight gauge is not available at 08 Series

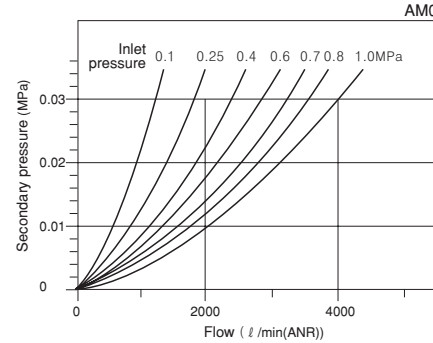
Specification

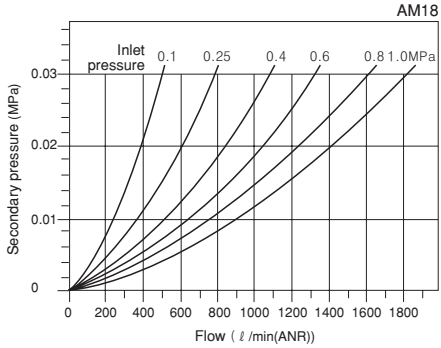
Item		Unit	AM08		AM18			AM28		
Port size			1/8"	1/4"	1/4"	3/8"	1/2"	3/8"	1/2"	3/4"
Fluid			Air							
Filtration	Grade B	μm	0.5(Borosilicate Cloth)							
	Grade C		0.01(Borosilicate Cloth)							
	Grade D		0.003(Activated Carbon)							
Max. Operating pressure	Plastic bowl	MPa(bar)	1.03 (10.3)							
	Metal bowl		1.72 (17.2)							
Max. Operating temperature	Plastic bowl	℃	52.0							
	Metal bowl		65.5							
Useful retention		cm^3	12		51			85		
Weight		kg	0.11		0.32			0.5		

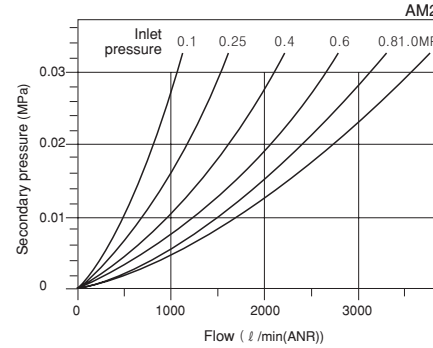
Flow capacity



Flow characteristics



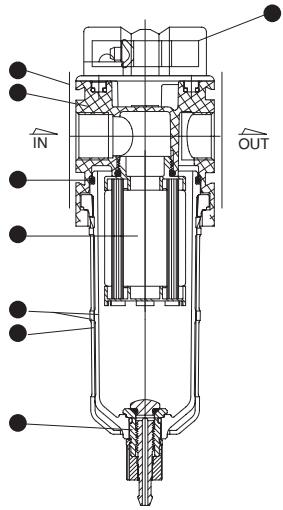


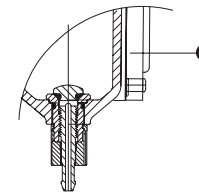


Coalescing Filter

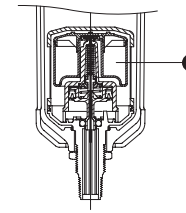
Constructions

(Unit : mm)





Metal bowl



Float type Auto drain

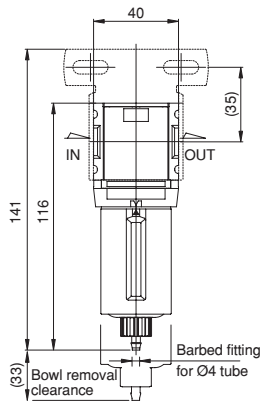
No.	Parts		Part No.			Material
			AM08	AM18	AM28	
1	Body		–	–	–	AL Alloy
2	Body cover		–	–	–	Plastic
3	Filter element	0.5 ㎛	MSP-96-732	MSP-96-647	MSP-96-649	Polyethylene
		0.1 ㎛	MTP-96-649	MTP-96-646	MTP-96-648	
		0.01 ㎛	MXP-96-222	MXP-96-650	MXP-96-651	
4	DPI Gauge					
5	Bowl O-ring		GRP-96-711	GRP-96-754	GRP-96-755	Fluorocarbon
6	Plastic bowl Ass'y	Manual drain	AGRP-96-712	AGRP-96-634	AGRP-96-642	Nitril
		Auto drain[1]	N/A	AGRP-96-635	AGRP-96-643	
7	Manual drain Ass'y		N/A	AGRP-96-685	AGRP-96-685	
8	Bowl Guide		–	–	–	Nylon
9	Auto drain Ass'y		GRP-96-716	GRP-96-200	GRP-96-200	–
10	Metal bowl	Manual drain	AGRP-96-714	AGRP-96-636	AGRP-96-644	–
		Auto drain[1]	N/A	AGRP-96-637	AGRP-96-645	

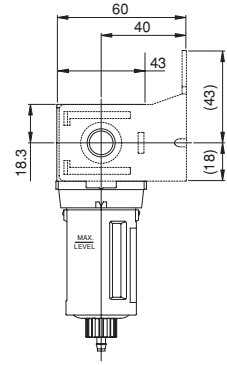
Note 1) In case of 08 Series is Piston type auto drain.

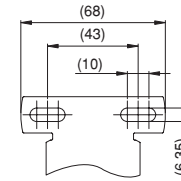
Dimension

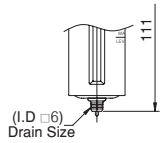
(Unit : mm)

AM08

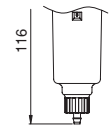




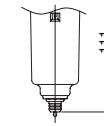




Plastic bowl
(Piston drain)



Metal bowl
(Manual drain)



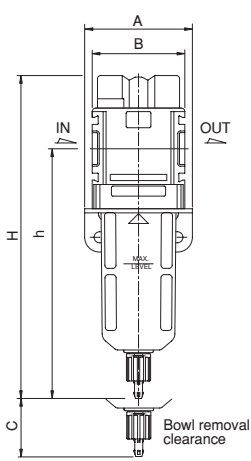
Metal bowl
(Piston drain)

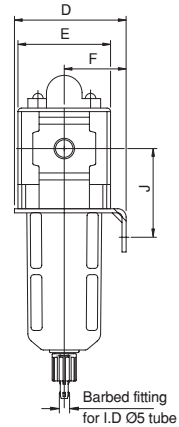
Coalescing Filter

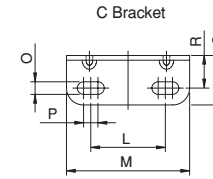
Dimension

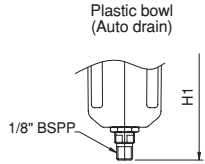
(Unit : mm)

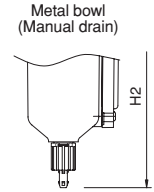
AM18 / 28

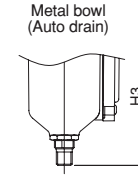










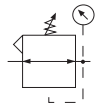


Series	A	B	C	D	E	F	H	h	H1	H2	H3	J	L	M	O	P	R	S
AM18	69.5	60	41	72	40	60	209	161	200	208	199	57.5	42	69.5	7	8	18.5	28
AM28	76	73	51	87	50	73	235	187	226	235	226	64	48	76	7	8	18.5	28

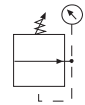
Regulator

AR08, 18, 28 Series

Symbol



Relieving



Non-Relieving

Order Key

AR 18 – T 3 – F 0 G 0

Series

AR	Regulator

Body size

08	1/8",1/4"
18	1/4",3/8",1/2"
28	3/8",1/2",3/4"

Thread Type

T	Rc(PT)
0	NPT
C	BSPP[1]

Port Size

		08	18	28
1	1/8"	•	–	–
2	1/4"	•	•	–
3	3/8"	–	•	•
4	1/2"	–	•	•
6	3/4"	–	–	•

Pressure range and seal

Function	Seal	0~0.4MPa (0~4.1 bar)	0~0.86MPa (0~8.6 bar)	0~1.72MPa[2] (0~17.2 bar)
Relieving	NBR	D	F	G
	Fluorocarbon	K	L	M
Non-Relieving	NBR	W	R	S
	Fluorocarbon	X	Y	Z

Option 2

0	None
M	Round gauge for 08 Series
E	Square gauge for 08 Series
G	Round gauge for 08/28 Series
P	Metal panel nut
R	Reverse flow

※Note) When selecting from the options columns, please enter letters in alphabetical.

Option 1

0	None
M	Round gauge for 08 Series
E	Square gauge for 08 Series
G	Round gauge for 08/28 Series
P	Metal panel nut
R	Reverse flow

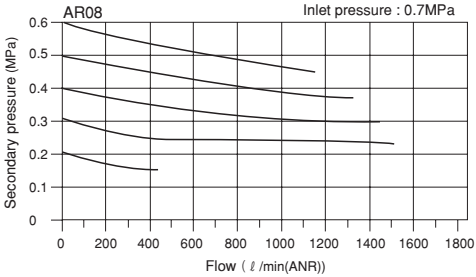
1. ISO, R228(G Series)
2. Not available on 08 Series

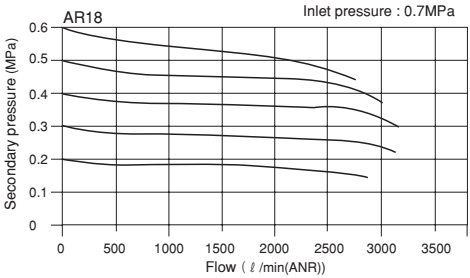
Regulator

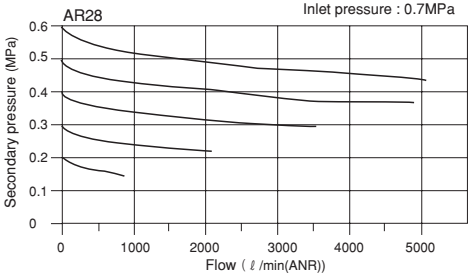
Specification

Item		Unit	AR 08		AR 18			AR 28		
Port size			1/8"	1/4"	1/4"	3/8"	1/2"	3/8"	1/2"	3/4"
Gauge port size			1/8"		1/4"			1/4"		
Fluid			Air							
Adjusting range pressure	Standard	MPa(bar)	0.86 (8.6)		0.86 (8.6)			0.86 (8.6)		
	Low pressure type		0.41 (4.0)		0.41 (4.0)			0.41 (4.0)		
	High pressure type		–		1.72 (17.2)			1.72 (17.2)		
Max. Operating temperature		℃	0 ~ 65.5							
Weight		kg	0.17		0.41			0.62		

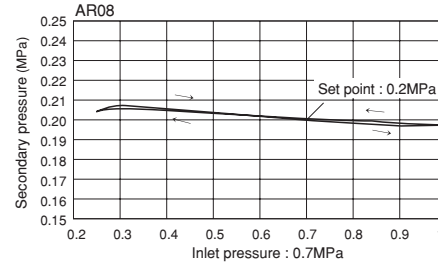
Flow characteristics

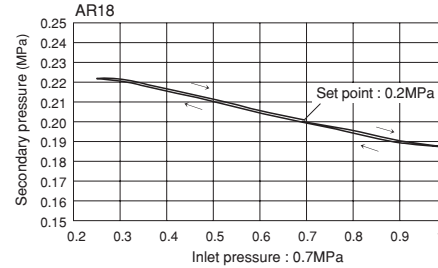


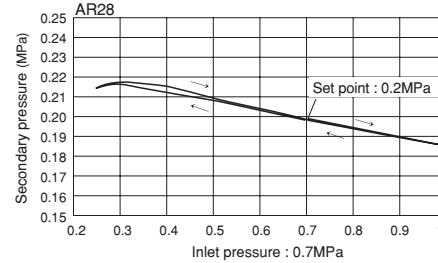




Pressure characteristics

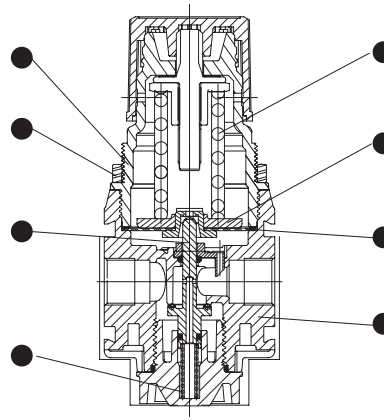






Constructions

(Unit : mm)



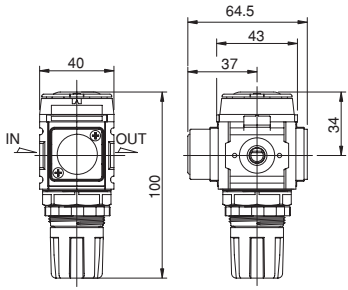
No.	Parts		Part No.			Material
			AR 08	AR 18	AR 28	
1	Body					AL Alloy
2	Valve ASS'Y		ARRP-96-727	ARRP-96-658	ARRP-96-684	
3	Bottom spring					Steel
4	Diaphragm plate					ZN Alloy
5	Diaphragm	Relieving	AGRP-96-725	ARRP-96-656	ARRP-96-682	Nitril
		Non-Relieving	AGRP-96-726	ARRP-96-657	ARRP-96-683	
6	Bonnet					Polybutylene
7	Spring	0~4.1 bar	AGRP-95-718	ARRP-96-660	ARRP-96-164	Steel
		0~8.6 bar	AGRP-96-717	ARRP-96-661	ARRP-96-165	
		0~17.2 bar	N/A	ARRP-96-662	ARRP-96-166	
8	Panel nut		ARPA-96-734	ARRP-96-675	ARRP-96-676	Plastic

Regulator

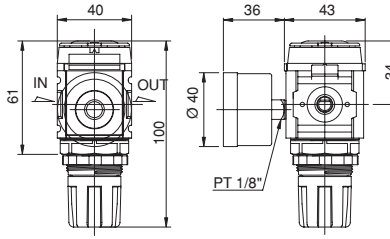
Dimension

(Unit : mm)

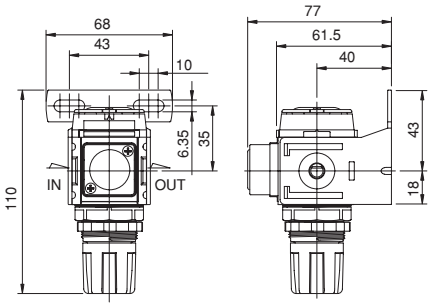
AR08



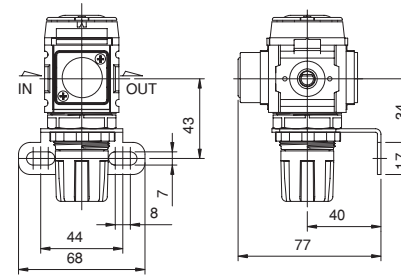
Square gauge



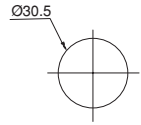
Round gauge



C-Bracket Mounting



L-Bracket Mounting

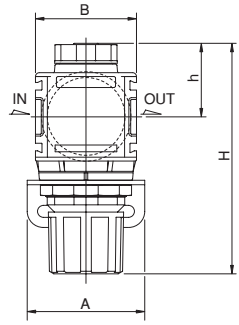


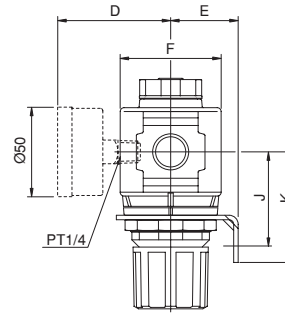
Machining dimension for panel mounting
(Panel thickness : Max. 5.5mm)

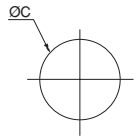
Dimension

(Unit : mm)

AR18 / 28

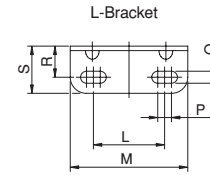






Machining dimension for panel mounting
(Panel thickness : Max. 6.6mm)

L-Bracket

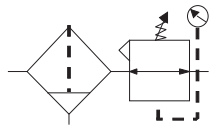


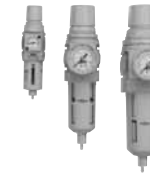
Series	A	B	C	D	E	F	H	h	J	K	L	M	O	P	R	S
AR18	69.5	60	48	71	40	60	135.5	43.5	53.5	63	42	69.5	7	8	18.5	28
AR28	76	73	61	77.5	49	73	148	148	56	65.5	48	76	7	8	18.5	28

Filter-Regulator

AB08, 18, 28 Series

Symbol





Order Key

AB 18 – T 3 – F K G 0

Series

AB	Filter Regulator

Body size

08	1/8",1/4"
18	1/4",3/8",1/2"
28	3/8",1/2",3/4"

Thread Type

T	Rc(PT)
O	NPT
C	BSPP[1]

Port Size

		08	18	28
1	1/8"	●	–	–
2	1/4"	●	●	–
3	3/8"	–	●	●
4	1/2"	–	●	●
6	3/4"	–	–	●

Pressure range and seal

Function	Seal	0~0.4MPa (0~4.1 bar)	0~0.86MPa (0~8.6 bar)	0~1.72MPa[3] (0~17.2 bar)
Relieving	NBR	D	F	G
	Fluorocarbon	K	L	M
Non-Relieving	NBR	W	R	S
	Fluorocarbon	X	Y	Z

Bowls / Drains

Drain	Bowls	
	Plastic bowl	Metal bowl[2]
Auto Drain[3]	G	H
Manual Drain	K	L
Piston Drain	R	S

※Piston drain is available only 08 Series

Option 1

0	None
M	Round gauge for 08 Series
E	Square gauge for 08 Series
G	Round gauge for 08/28 Series
L	DPI gauge[3]
V	Fluorocarbon

※Note) When selecting from the options columns, please enter letters in alphabetical.

Option 2

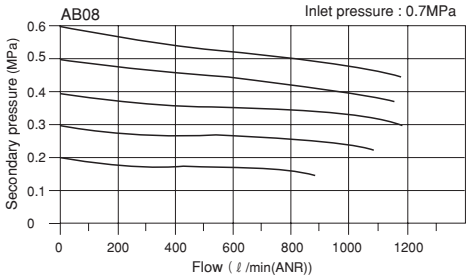
0	None
M	Round gauge for 08 Series
E	Square gauge for 08 Series
G	Round gauge for 08/28 Series
L	DPI gauge[3]
V	Fluorocarbon

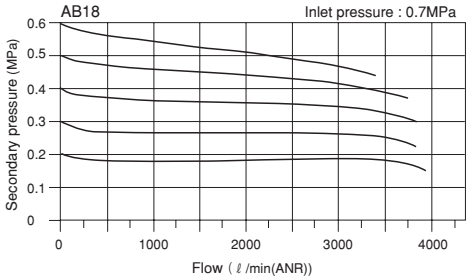
1. ISO, R228(G Series)
2. Sight gauge is not available at 08 Series
3. Not available on 08 Series.

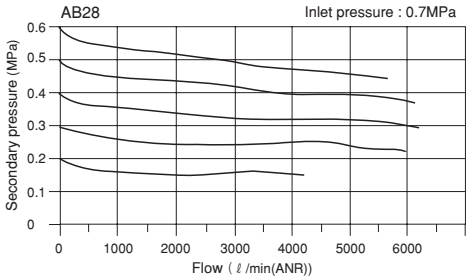
Specification

Item		Unit	AB 08		AB 18			AB 28		
Port size			1/8"	1/4"	1/4"	3/8"	1/2"	3/8"	1/2"	3/4"
Gauge port size			1/8"		1/4"			1/4"		
Fluid			Air							
Filtration		㎛	5							
Max. Operating pressure	Plastic bowl	MPa(bar)	0.86 (8.6)							
	Metal bowl		1.72 (17.2)							
Max. Operating temperature	Plastic bowl	℃	52.0							
	Metal bowl		65.5							
Useful retention(Filter)		cm^3	12		51			85		
Weight		kg	0.19		0.53			0.85		

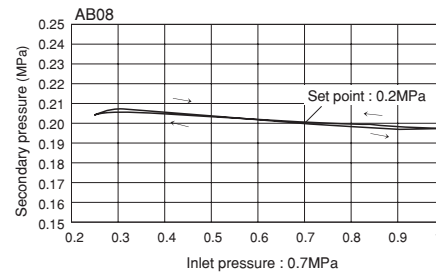
Flow characteristics

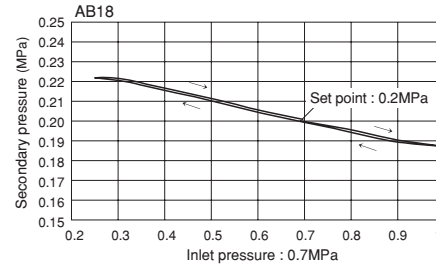


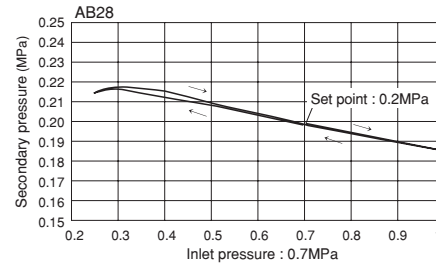




Pressure characteristics



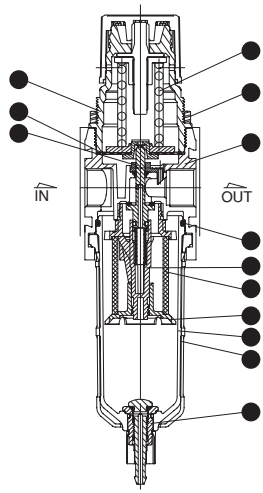


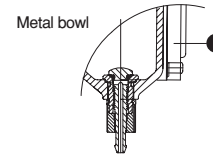


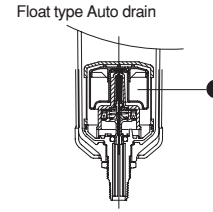
Filter-Regulator

Constructions

(Unit : mm)







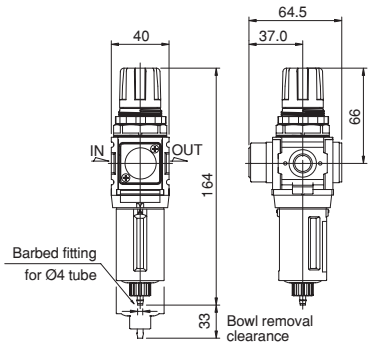
No.	Parts		Part No.			Material
			AB 08	AB 18	AB 28	
1	Body		–	–	–	AL Alloy
2	Deflector		–	–	–	Plastic
3	Filter element (5 Micron)		AFRP-96-729	AFRP-96-639	AFRP-96-653	Polyethylene
4	Baffle		N/A	AFRP-96-641	AFRP-96-283	Plastic
5	Bowl O-ring		GRP-96-710	GRP-96-640	GRP-96-654	Nitril
	Bowl O-ring(Fluorocarbon)		GRP-96-711	GRP-96-754	GRP-96-755	Fluorocarbon
6	Manula drain Ass'y		N/A	AGRP-96-685	AGRP-96-685	Plastic
7	Plastic bowl Ass'y	Manual drain	AGRP-96-712	AGRP-96-634	AGRP-96-642	Polycarbonate
		Auto drain[1]	N/A	AGRP-96-635	AGRP-96-643	
8	Bowl Guide		–	–	–	Nylon
9	Valve		ARRP-96-727	ARRP-96-658	ARRP-96-684	Brass
10	Diaphragm	Relieving	AGRP-96-725	ARRP-96-656	ARRP-96-682	Nitril
		Non-Relieving	AGRP-96-726	ARRP-96-657	ARRP-96-683	
11	Bonnet					Plastic
12	Spring	0~4.1 bar	AGRP-95-718	ARRP-96-660	ARRP-96-164	SUS304
		0~8.6 bar	AGRP-96-717	ARRP-96-661	ARRP-96-165	
		0~17.2 bar	N/A	ARRP-96-662	ARRP-96-166	
13	Panel nut		ARPA-96-733	ARRP-96-673	ARRP-96-674	Plastic
14	Auto drain Ass'y		GRP-96-716	GRP-96-200	GRP-96-200	–
15	Metal bowl	Manual drain	AGRP-96-714	AGRP-96-636	AGRP-96-644	–
		Auto drain[1]	N/A	AGRP-96-637	AGRP-96-645	

Note 1) In case of 08 Series is Piston type drain.

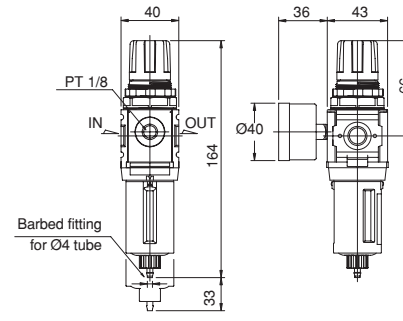
Dimension

(Unit : mm)

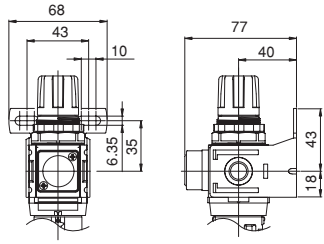
AB08



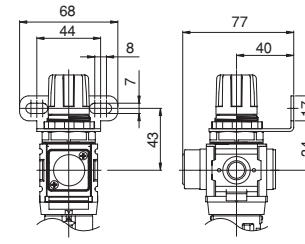
Plastic bowl
(Manual drain)



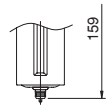
Plastic bowl
(Manual drain)



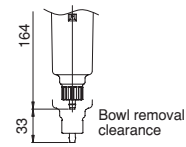
C-Bracket Mounting



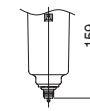
L-Bracket Mounting



Plastic bowl
(Piston drain)



Metal bowl
(Manual drain)



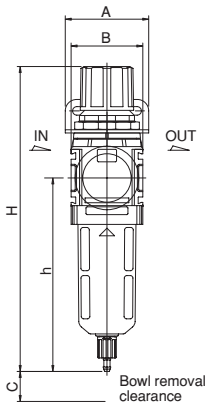
Metal bowl
(Piston drain)

Filter-Regulator

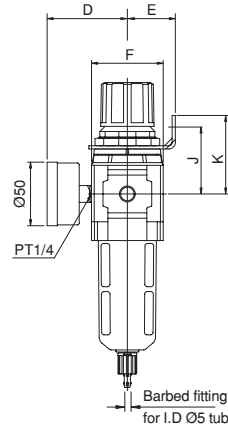
Dimension

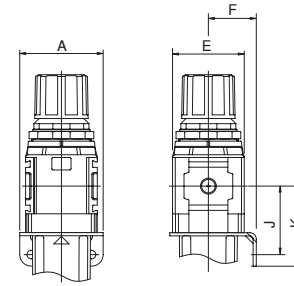
(Unit : mm)

AB18 / 28

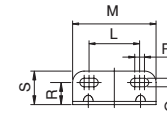


Plastic bowl / manual drain

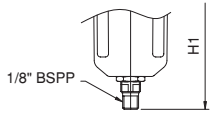


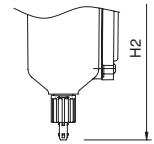


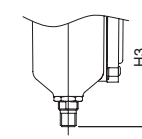
C-BRACKET TYPE



L-BRACKET TYPE





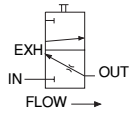


Series	A	B	C	D	E	F	H	h	H1	H2	H3	J	K	L	M	O	P	R	S
AB18	69.5	60	41	71	40	60	254	161	245	253	244	56	65.5	42	69.5	7	8	18.5	28
AB28	76	73	51	77.5	49	73	291	187	282	291	282	54	68.5	48	76	7	8	18.5	28

Safety Lockout Valve

V08, V18, V28 Series

Symbol



Order Key

V 18 - T 3 - 0 0 0 0 - 3 6

Series

V	Safety Lockout Valve

Body size

08	1/8",1/4"
18	1/4",3/8",1/2"
28	3/8",1/2",3/4"

Thread Type

T	Rc(PT)
0	NPT
C	BSPP

Port Size

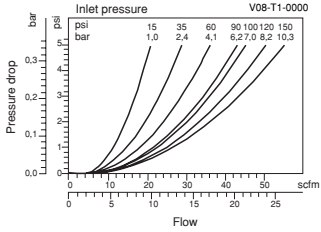
		08	18	28
1	1/8"	•	–	–
2	1/4"	•	•	–
3	3/8"	–	•	•
4	1/2"	–	•	•
6	3/4"	–	–	•

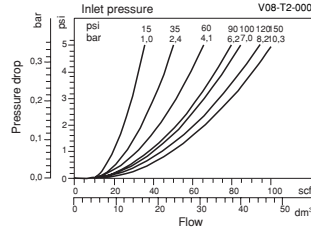
Specification

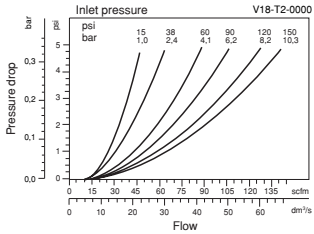
Item	Unit	V 08		V18			V 28		
Port size		1/8"	1/4"	1/4"	3/8"	1/2"	3/8"	1/2"	3/4"
Exhaust capacity	Cv	0.25		1.03			1.05		
Fluid		Air							
Max. Operating pressure	MPa(bar)	1.03 (10.3)							
Max. Operating temperature	℃	65.5							
Weight	kg	0.3		0.34			0.41		

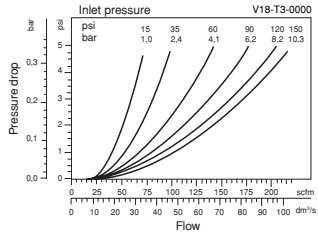
Safety Lockout Valve

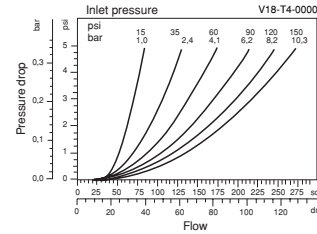
Flow characteristics

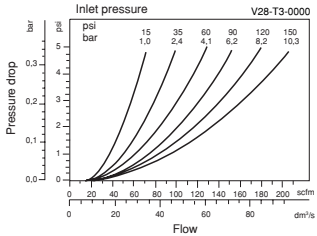


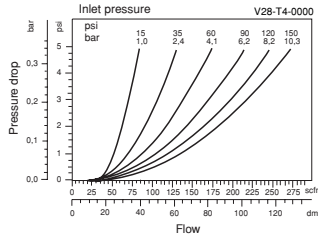


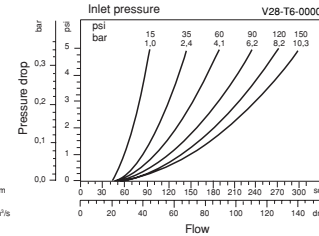










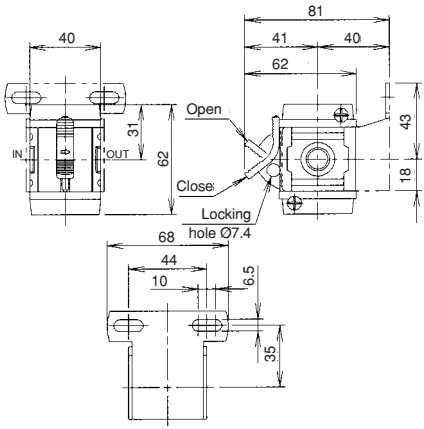


Note) N ℓ /min = scfm × 28.57

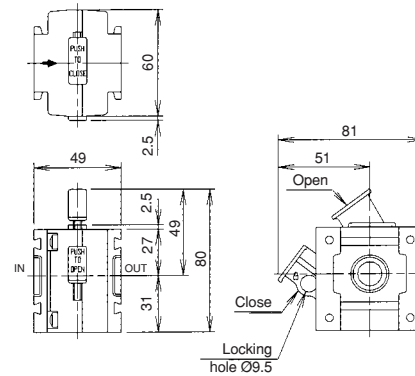
Dimension

(Unit : mm)

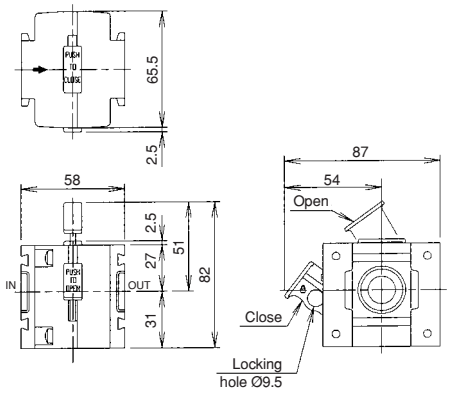
V08



V18



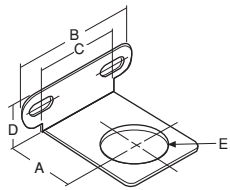
V28



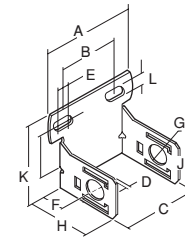
Accessories

Individual Mounting Bracket

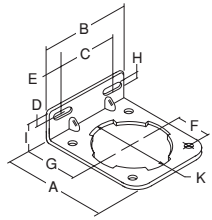
L Bracket / AGPA-96-739



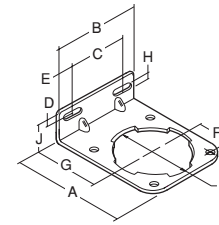
C Bracket / AGPA-97-010



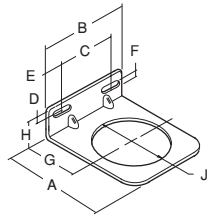
L Bracket / AGPA-96-604



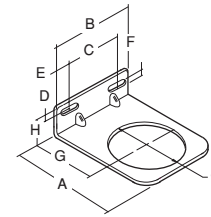
L Bracket / AGPA-96-605



L Bracket / AGPA-96-606



L Bracket / AGPA-96-607

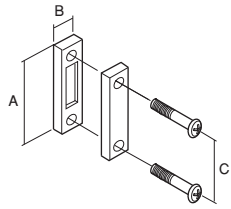


(Unit : mm)

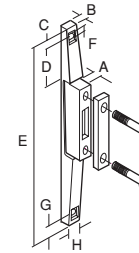
Part No.	Application	A	B	C	D	E	F	G	H	J	K	L		
AGPA-97-010	AF08, AM08, AB08, AL08	68	44	40	1.8	9.9	40	20	59	35	61	66		
AGPA-96-604	AF18, AM18, AB18, AL18	72	69.5	42	9.6	14	22	40	7.1	28	57	–		
AGPA-96-605	AF28, AM28, AB28, AL28	87	76	48	9.6	14	28	49	7.1	28	67.5			
AGRA-96-739	AR08	40	68	44	25	30	–	–	–	–				
AGPA-96-606	AR18	69.5	69.5	42	11	14	7.1	40	25	51	–	–		
AGPA-96-607	AR28	84.5	76	48	11	14	7.1	49	25	61	–	–		

Modular Mounting Bracket

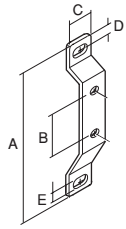
Joiner set / AGPA-96-738



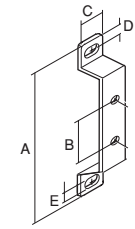
T Bracket / AGPA-96-737 (Including Joiner set)



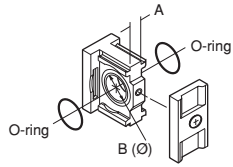
T Bracket / AGPA-96-602



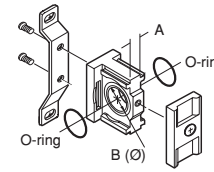
T Bracket / AGPA-96-602L



Joiner set



T Bracket / AGPA-96-603 (Including Joiner set)



(Unit : mm)

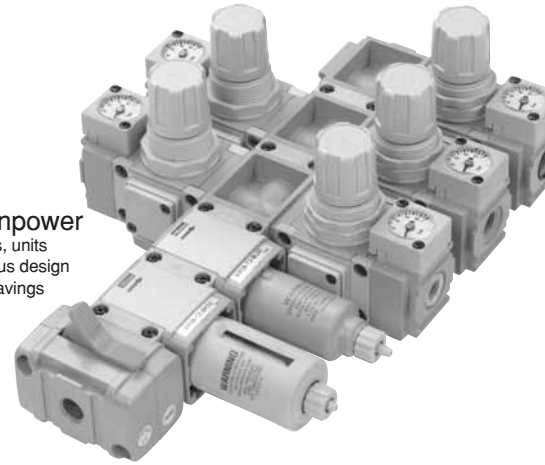
Part No.	Application	Part No.	A	B	C	D	E	F	G	H		
Joiner set	AC08	AGPA-96-738	36	9.9	26	–	–	–	–	–		
T-Bracket (Including Joiner set)	AC08	AGPA-96-737	11	7.1	10	17	100.8	5.6	10	16		
T-Bracket	AC18, AC28	AGPA-96-602	95	32	19.3	6.3	7.1	–	–	–		
	AC18, AC28	AGPA-96-602L	95	32	19.3	6.3	7.1	–	–	–		
Joiner set	AC18, AC28	AGPA-96-601	8.9	22.1	–	–	–	–	–	–		
T-Bracket (Including Joiner set)	AC18, AC28	AGPA-96-603	8.9	22.1	–	–	–	–	–	–		

System Unit

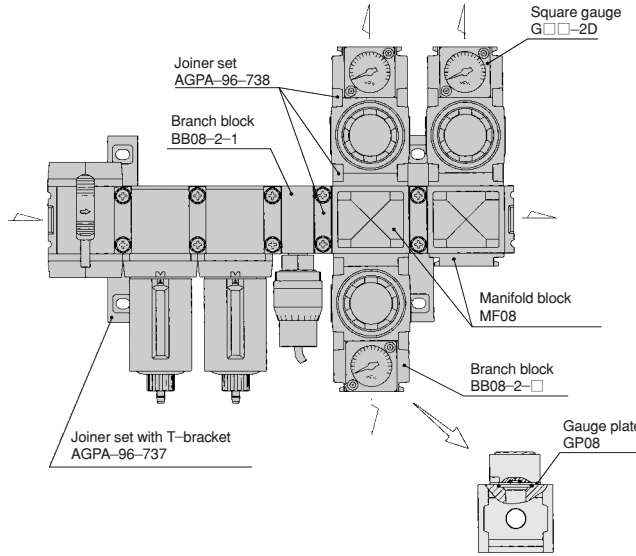
■ Compact
Modular construction saves space

■ Save the piping work manpower
with the provided modular attachments, units may be manifolded allowing tremendous design flexibility as well as signification cost savings

■ Accurate mounting size
Designed for easy installation

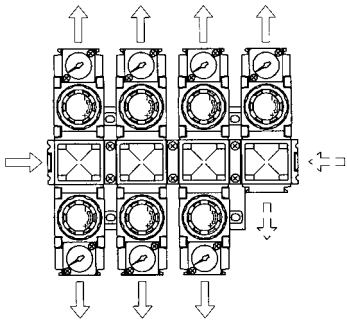


Example)

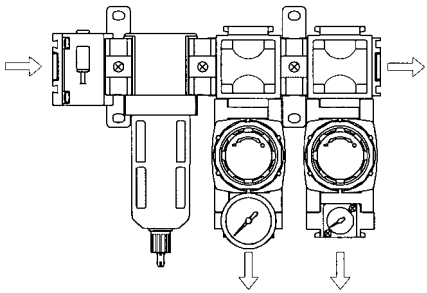


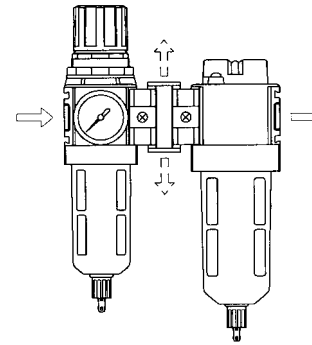
SYSTEM UNIT is capable of combining in many ways a variety of components and attachments and also extending or branching out as desired

■ Basic combination of MANIFOLD REGULATOR. Two or more pressure settings are united. Quanlity of DIVERTER can be set ad desired.



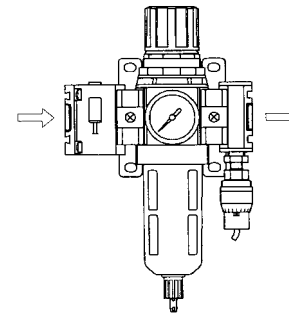
■ When SHUT OFF VALVE with keyhole is connected to INTEGRAL FILTER-REGULATOR, f MANIFOLD REGULATOR. maintenance and inspection of the machine can be safely performed. Pressure can also be monitored using PRESSURE SWITCH.





■ Compounding of difference size (18 + 28 Series)

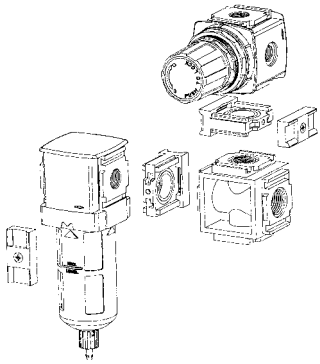
- To connect large size Coalescing filter (AM28) and small size filter (AF18 / AB18) can be properly used according to the intended flow rate.

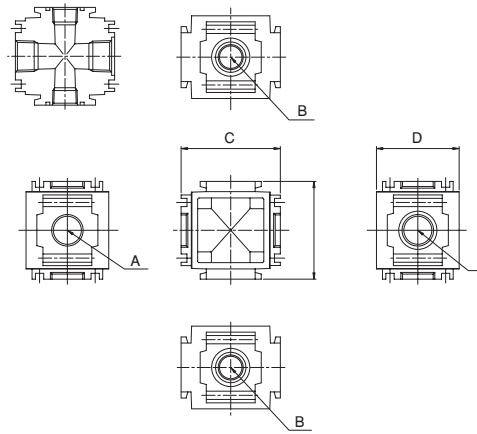


■ A one piece block with pressure gauge and pressure switch

■ Manifold Block

- A system block of four planes (Top, bottom, both sides) are connected and branched to two or more components or attachments.
  It is used as a base for manifolds regulator.

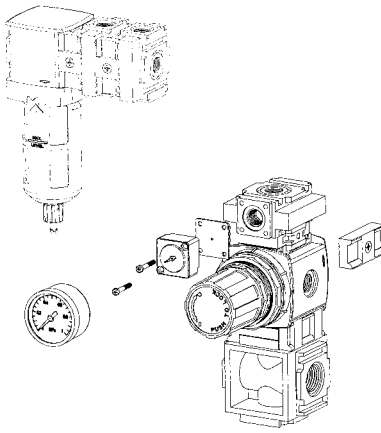


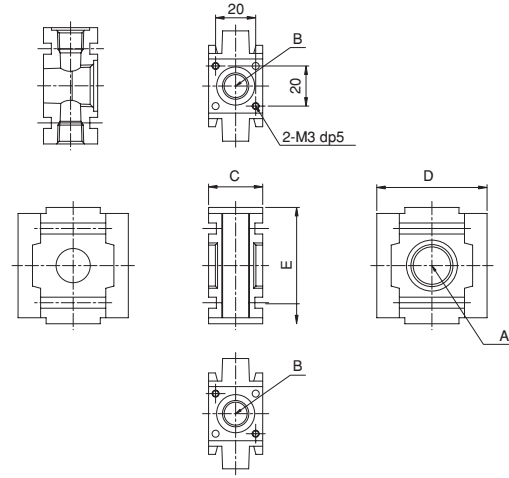


Part No.	Application	A	B	C	D	E
MF08	08 Series	Rc1/4	Rc1/4	51.4	40	45
MF18	18, 28 Series	Rc1/2	Rc3/8	66	55	65

■ Branch Block

- The Branch Block is mounted component to be connected so as to branch out air piping or also can be used for connecting pressure gauge.

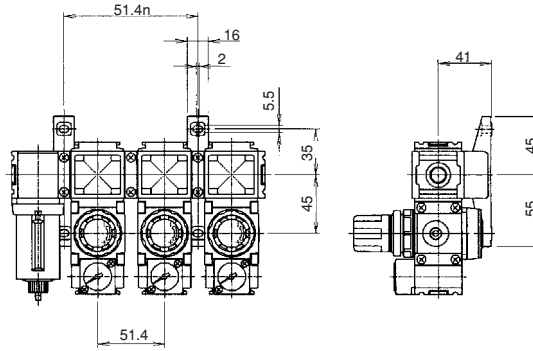




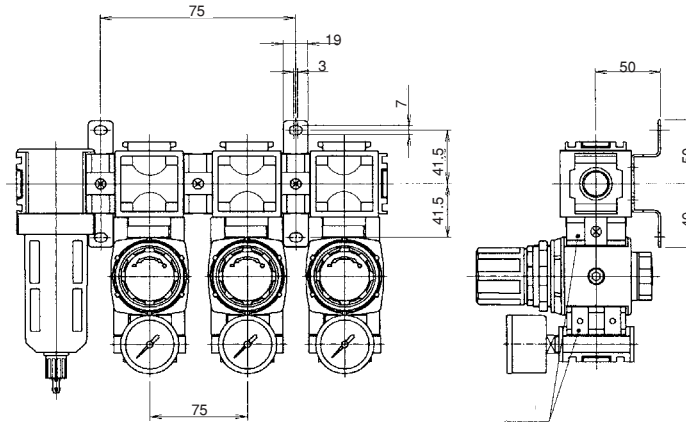
Part No.	Application	A	B	C	D	E
BB08-2-1	08 Series	Rc1/4	Rc1/4	27	40	36
BB08-2-2		Rc1/4	Rc1/4			
BB18-2-2	18, 28 Series	Rc1/4	Rc1/4	27	55	58
BB18-3-2		Rc3/8	Rc1/4			
BB18-4-2		Rc1/2	Rc1/4			

Dimension of System Block

■ AC08 Series



■ AC18, 28 시리즈



Note 1 : Spacer width(9mm) must be added when the length is calculated between manifold blocks .
Note 2 : AC18, 28 Joiner set can be mounted on side only.
Note 3 : For AR18, 28 Manifold, T-bracket AGPA-96-603L should be used.
Other bracket can be interrupted.

■ Attachment

Joiner set ordering

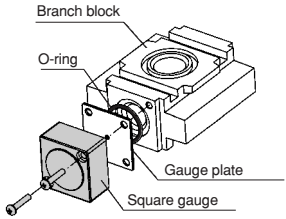
Used on	Joiner set	Joiner set with T–Bracket	Distance between Center of Port and mounting wall
08 Series	AGPA-96-738	AGPA-96-737	41mm
18, 28 Series	AGPA-96-601	AGPA-96-603	39mm
		AGPA-96-603L	50mm

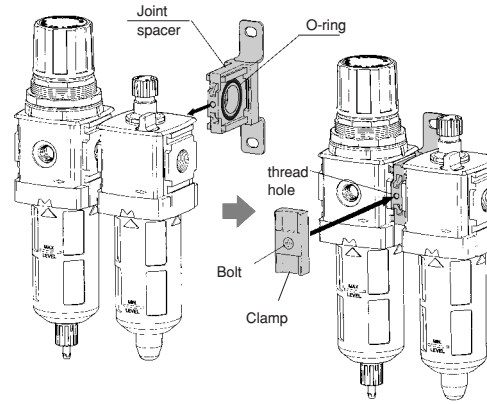
Note) Please choose the AGPA-96-603L bracket when AR18/28 are manifolded.

Other

Name	Part No.
Gauge plate (with O-ring)	GP08

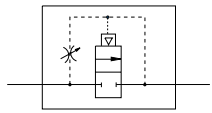
Note) Please order this additionally when you mount the square gauge on branch block





Slow Start Valve / S Series

Symbol



ORDER KEY

S 18 – T 3 – A 0 0 0 0

Series
Slow Start Valve

Body Size

18	¼, ⅜, ½
28	⅜, ½, ¾

Therad Type

0	NPT
C	BSPP(G)

Port Size

2	¼
3	⅜
4	½
6	¾

Actuator

A	Internal Pilot

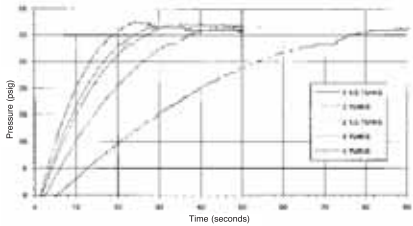
Specification

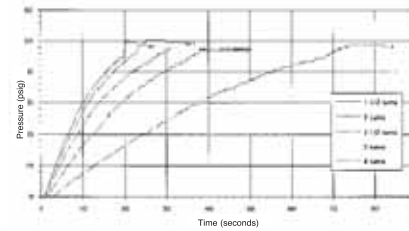
Model No.		Unit	S18	S28
Flow Capacity	¼	ℓ / min (ANR)	2,714	-
	⅜		2,886	5,599
	½		3,228	5,999
	¾		-	6,571
Fluid			Air	
Max. Flow Rate(Across Needle Valve)		ℓ / min (ANR)	342.84 (A000)	
Maximum Operating Pressure		MPa(bar)	1.03 (10.3)	
Minimum Supply Pressure		MPa(bar)	0.21 (2.1)	
Maixmum Operating Temperature		℃	65.5	
Weight		kg	0.42	0.53

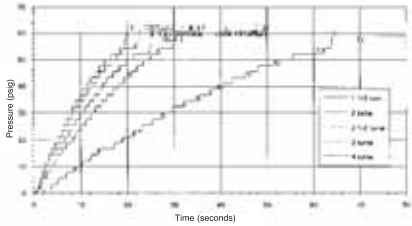
Note) Inlet Pressure 10. 3 bar, Pressure drop 0.3 bar

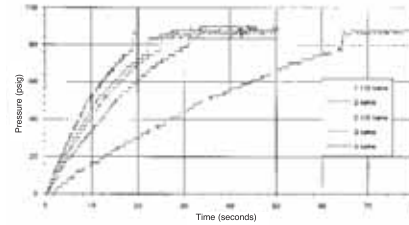
Slow Start Valve

Time vs Pressure



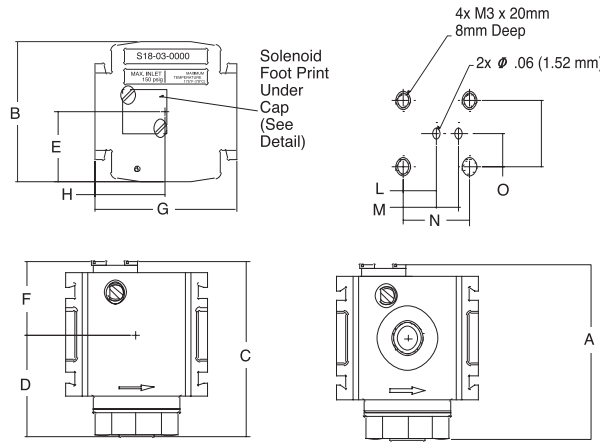






Dimensions

(Unit : mm)

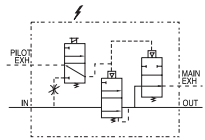


	A	B	C	D	E	F	G	H	L	M	N	O	P
S18	75	60	75	43.5	30	31	60	30	7.0	4.6	14	7.0	14
S28	77	73	77	45.5	36.5	31	73	36.5	7.0	4.6	14	7.0	14

Emergency Stop Valve

E18, E28 Series

Symbol



Order Key

E 18 – 0 3 – E C 0 0

Series

E	Emergency stop valve +Slow Starter

Body size

18	1/4″, 3/8″, 1/2″
28	3/8″, 1/2″, 3/4″

Thread type

T	Rc(PT)
0	NPT
C	BSPP[1]

Voltage

C	24V DC
D	120V AC 50/60 Hz

Actuator

E	Solenoid(NC)[2]

Port Size

2	1/4"
3	3/8"
4	1/2"
6	3/4"

1. ISO, R228 (G Series)
2. Normally **Closed**

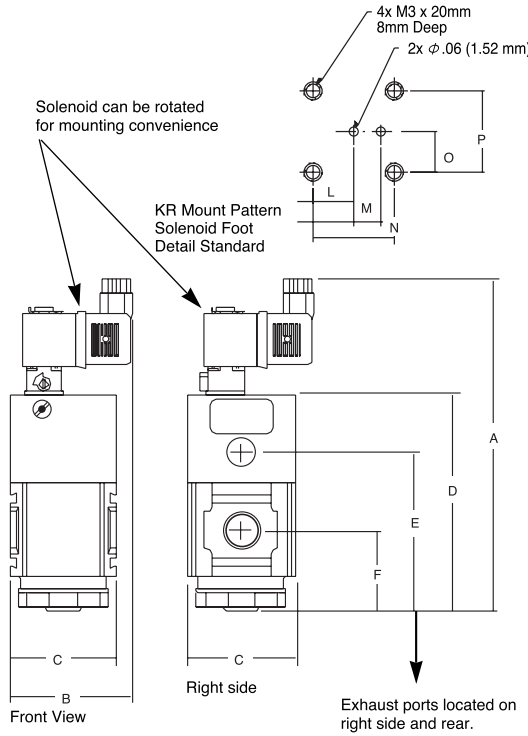
Emergency Stop Valve with Slow-Start

The Emergency Stop Valve with Slow-Start is designed as a three-Way Emergency Stop Valve with a built-in slow-start capability. This Slow-Start capability allows control of downstream pressure buildup at start-up of a compressed air system. The combination of Slow-Start and Emergency Stop reduces the number of pneumatic components and the unique volume-independent design allows any number of additons to the pneumatic circuit without readjusting the Slow-Start function.

Emergency Stop Valve

Dimensions

(Unit : mm)



	A	B	C	D	E	F	L	M	N	O	P
E18	186	68.5	60	122	89.4	45.4	7.0	4.6	14	7.0	14
E28	186	75.1	73.1	122	89.4	45.4	7.0	4.6	14	7.0	14

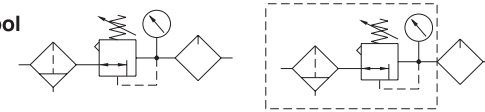
Parker
Pneumatic

Air Service Unit
AU Series

FRL Modular Combination

AU200 Series

Symbol



ORDER KEY

AU — **2** **00** — **8** — **AD20** — **40**

Series
Modular combination

Body size

2	1/4"

Combination

00	F+R+L 3-Combination
10	FR+L 2-Combination

Port Size

8	1/4"

Drain options

None	Manual Drain
AD20	Semi-Auto Drain

Filter element

None	5 ㎛
40	40 ㎛

Specifications

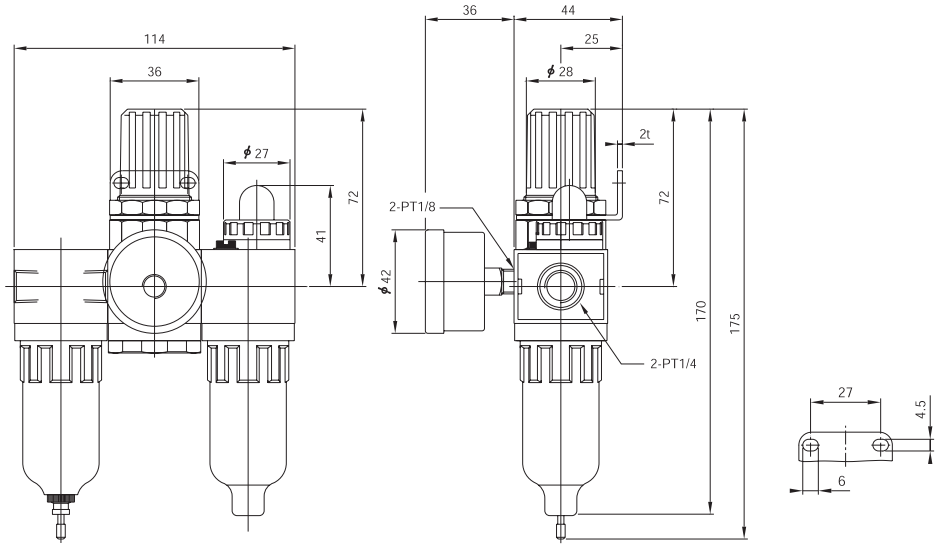
Model No.		Unit	AU200	AU210
	Fliter		AF200	–
	Regulator		AR200	–
	Lubricator		AL200	AU200
	Fliter Regulator		–	AFR200
Port size			Rc 1/4"	
Gauge Port			Rc 1/8"	
Fluid			Air	
Filter element		㎛	5 (Option : 40)	
Adjusting pressure range		MPa (bar)	0.05~0.85 (0.5 ~ 8.5)	
Max supply pressure		MPa (bar)	1.0 (10.0)	
Temperature range		℃	0 ~ 60	
Proof pressure		MPa (bar)	15.0	
Lubrication			Turbin #1 (ISO VG32)	

FRL Modular Combination

Dimensions

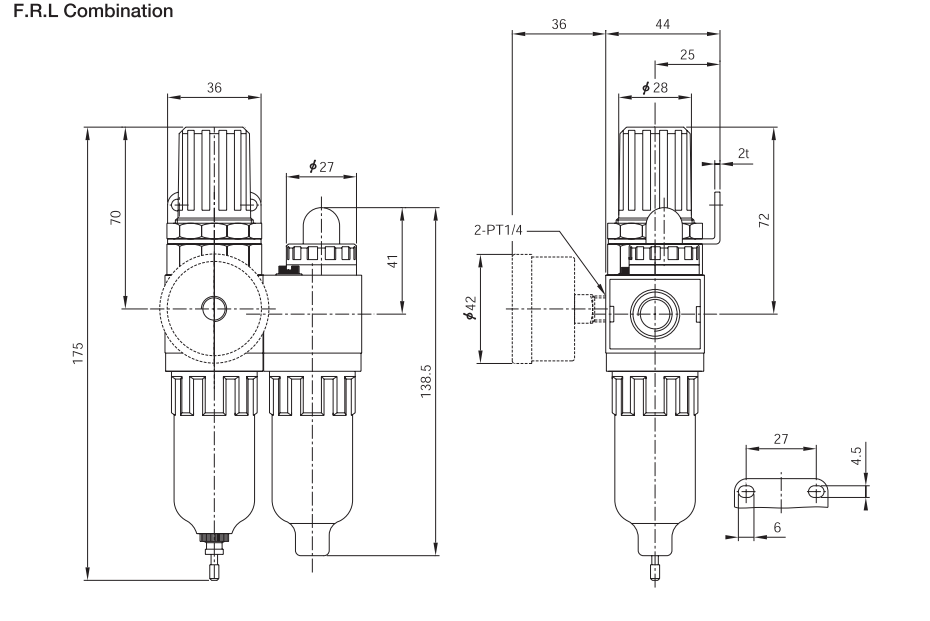
(Unit : mm)

F.R.L Combination



(Unit : mm)

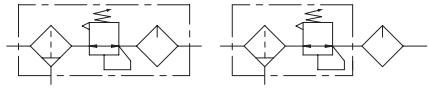
F.R.L Combination



FRL Modular Combination

AU320, AU420 Series

Symbol



ORDER KEY

AU — 3 — 20 — 10 — AD41 — 40

Series

Modular combination

Body size

3	3/8″
4	1/2″

Combination

20	F+R+L 3-Combination
21	FR+L 2-Combination

Port size

10	3/8″	AU320
15	1/2″	AU420

Drain options

None	Manual Drain
AD41	Auto Drain

Filter element

None	5㎛
40	40㎛

Specifications

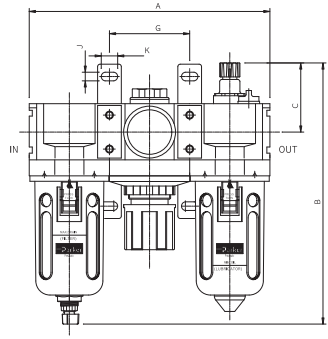
Model No		Unit	AU320	AU321	AU420	AU421
	Filter		AF320	-	AF420	-
	Regulator		AR320	-	AR420	-
	Lubricator		AL320	AL320	AL420	AL420
	Filter Regulator		-	AFR320	-	AFR420
Port size			Rc(PT), 3/8"		Rc(PT) 1/2"	
Gauge port			Rc(PT) 1/8"		Rc(PT) 1/4"	
Fluid			Air			
Proof pressure		MPa (bar)	1.5 (15.0)			
Max supply pressure		MPa (bar)	1.0 (10.0)			
Adjusting pressure range		MPa (bar)	0.05~0.85 (0.5~8.5)			
Temperature range		℃	0 ~ 60			
Filter element		㎛	5 (Option : 40)			
Lubrication			Turbin #1 (ISO VG32)			
Weight		g	1,126	928	1,618	1,420

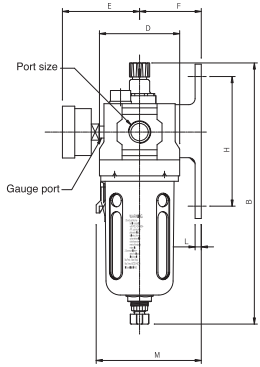
FRL Modular Combination

Dimensions

(Unit : mm)

AU 320 / AU 420



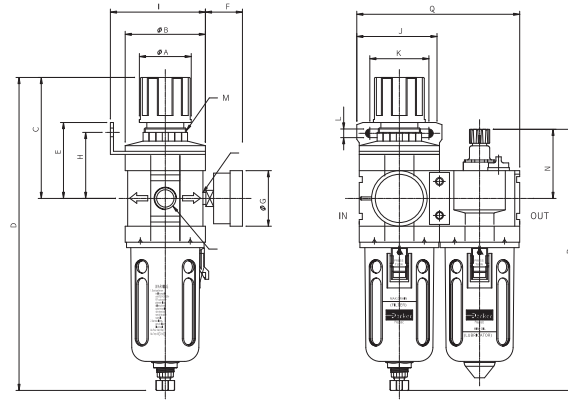


Model No.	Gauge Port size	Port size	A	B	C	D	Mounting Bracket							M
							E	F	G	H	J	K	L	
AU320	1/8"	1/4, 3/8"	195	206	56	65	67.5	45	65	105	7	14	7	86
AU420	1/4"	1/2"	240	224	56	80	75	45	80	105	7	14	7	93

Dimensions

(Unit : mm)

AU 321 / AU421

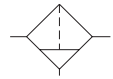


Model No.	Gauge Port size	Port size	A	ΦB	C	D	Mounting Bracket							M	N	P	Q
							E	F	ΦG	H	I	J	K	L				
AU321	1/8"	1/4", 3/8"	42	65	96	246	61.5	30	45	53.5	77	69	48	7	M36×P1.5	56	206	132
AU421	1/4"	1/2"	50	80	110	279	65	35	54	57	94.5	84	63	7	M42×P1.5	56	224	162

Filtler

AF200 Series

Symbol



ORDER KEY

AF **200** — **8** — **AD20** — **40**

Series
Air Filter

Port size

2	1/4"

Combination

8	1/4"

Drain options

None	Manual Drain
AD20	Semi-Auto Drain

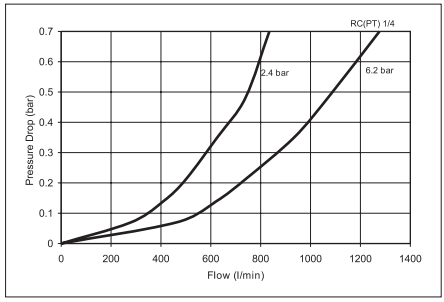
Filter element

None	5 ㎛
40	40 ㎛

Specifications

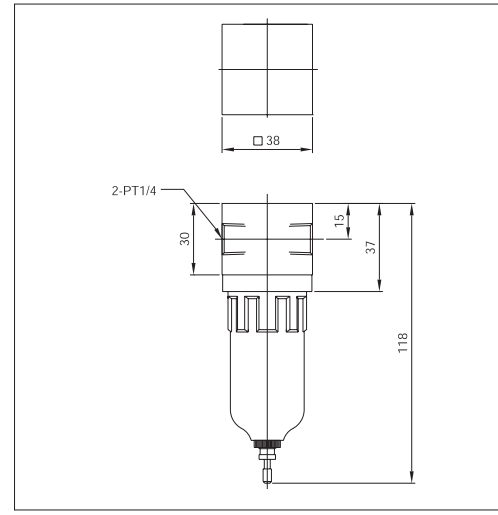
Model No.	Unit	AF200
Port size		Rc 1/4"
Filter element	㎛	5㎛ (Option : 40㎛)
Max Pressure	MPa (bar)	1.0 (10.0)
Proof Pressure	MPa (bar)	1.5 (15.0)
Temperature range	℃	0 ~ 60

Flow Characters



Dimensions

(Unit : mm)



Filtler

AF320, AF420 Series

Symbol

ORDER KEY

AF — 320 — 10 — AD41 — 40

Series

Air Filter

Body size

320	3/8″
420	1/2″

Port Size

8	1/4″	AF320
10	3/8″	
15	1/2″	AF420

Drain options

None	Manual Drain
AD41	Auto Drain

Filter Element

None	5㎛
40	40㎛

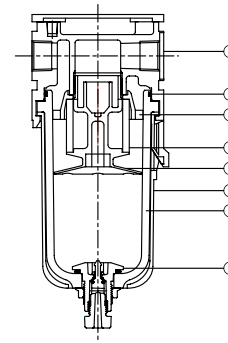
Specifications

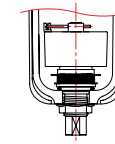
Model No	Unit	AF320	AF420
Port size		Rc(PT)1/4", 3/8"	Rc(PT)1/2"
element	㎛	5 (Option : 40)	
Proof pressure	MPa (bar)	1.5 (15.0)	
Max supply pressure	MPa (bar)	1.0 (10.0)	
Temperature range	℃	0~60	
Weight	g	286	444

Component

No	Description	Material
1	Body	Aluminium
2	Bowl	ABS
3	Bowl Guide	ABS
4	Bowl O-Ring	NBR
5	Defletor	ABS
6	Bufful	ABS
7	Element	ABS
8	Drain Ass'y	ABS

Constructions



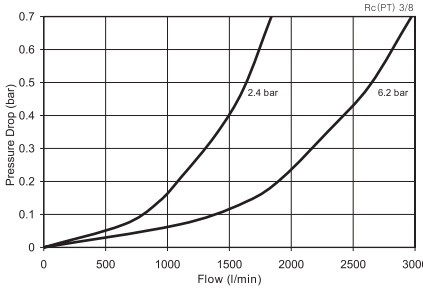


Float type auto drain

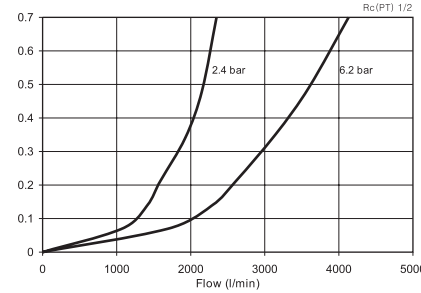
Filter

Flow Chart

AF320-10

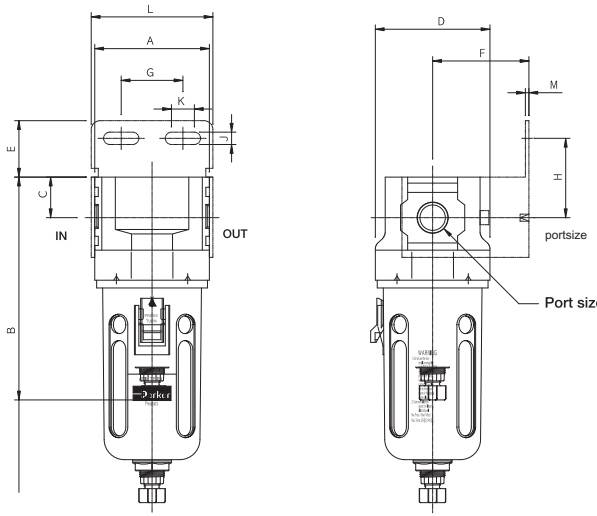


AF420-15



Dimensions

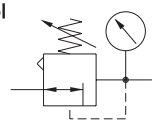
(Unit : mm)



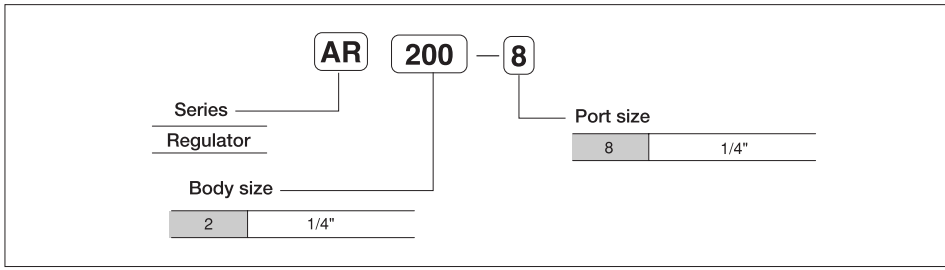
Model No	Port size Rc(PT)	A	B	C	D	Mounting Bracket							
						E	F	G	H	J	K	L	M
AF320	1/4", 3/8"	65	172	23	65	32	50	35	45	7	13	69	2.3
AF420	1/2"	80	190	23	80	32	50	50	45	7	13	85	2.3

Regulator
AR200 Series

Symbol



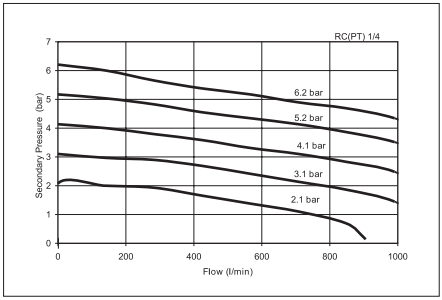
ORDER KEY



Specifications

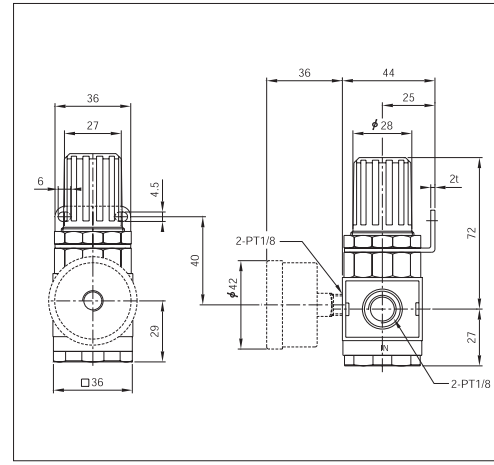
Model No	Unit	AR200
Port size		Rc 1/4"
Gauge port		Rc 1/8"
Fluid		Air
Proof pressure		1.5 (15.0)
Max supply pressure	MPa (bar)	1.0 (10.0)
Adjusting pressure range	MPa (bar)	0.05~0.85(0.5~8.5)
Temperature range	MPa (bar)	0 ~ 60
Construction	℃	Relieving

Flow Characters



Dimensions

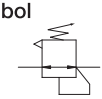
(Unit : mm)



Regulator

AR320, AR420 Series

Symbol



ORDER KEY

AR 320 – 10

Series

Regulator

Body size

300	3/8"
420	1/2"

Port Size

8	1/4"	AR320
10	3/8"	
15	1/2"	AR420

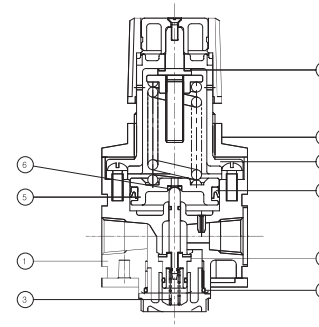
Specifications

Model No	Unit	AR320	AR420
Port size	Rc(PT)	3/8"	1/2"
Gauge port size		1/8"	1/4"
Fluid		Air	
Proof pressure	MPa (bar)	1.5 (15.0)	
Max pressure	MPa (bar)	1.0 (10.0)	
Adjusting range pressure	MPa (bar)	0.05~0.85 (0.5~0.85)	
Temperature	℃	0~60	
Construtions		Relieving	
Wight	g	370	590

Component

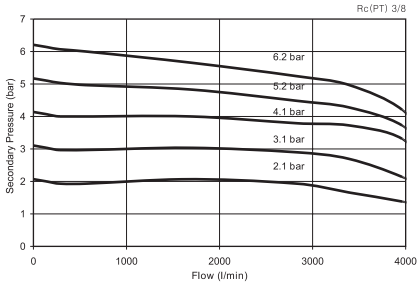
No	Descripiton	Material
1	Body	Aluminium
2	Valve Ass'y	Brass / NBR
3	Valve Spring	SUS
4	O-Ring	NBR
5	Piston Ass'y	ABS
6	Valve seat	NBR
7	Piston packing	NBR
8	Bonmet	ABS
9	Nut	ABS
10	Liner	ABS

Construction

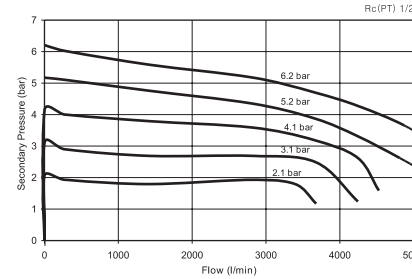


Flow Chart

AR320

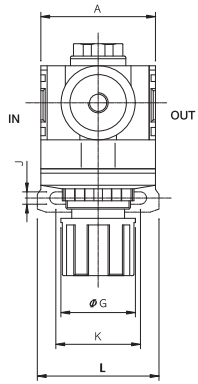


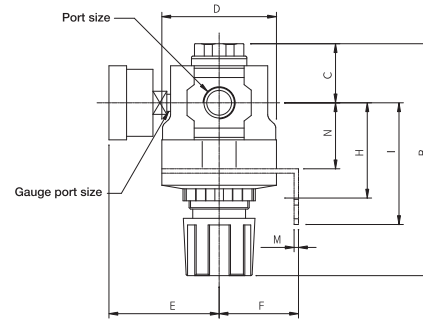
AR420



Dimensions

(Unit : mm)



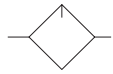


Model No	Gauge port size Rc(PT)	Port size Rc(PT)	A	B	C	D	Mounting									N
							E	F	ØG	H	I	J	K	L	M	
AR320	1/8"	1/4", 3/8"	65	131.5	33.5	65	62.5	45	42	53.5	61.5	7	48	69	2.5	35.5
AR420	1/4"	1/2"	80	145	35.5	80	70	55	50	57	65	7	63	84	2.3	38.5

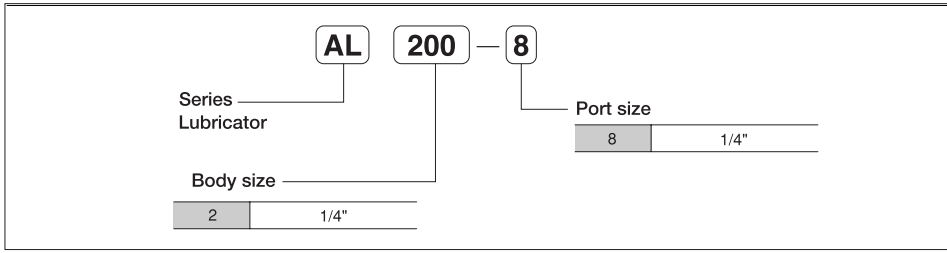
Lubricator

AL200 Series

Symbol



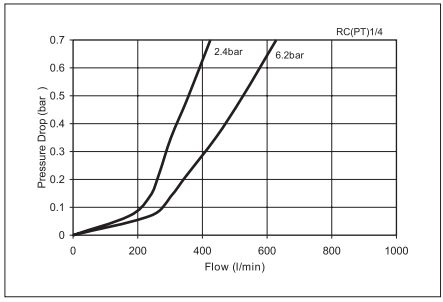
ORDER KEY



Specifications

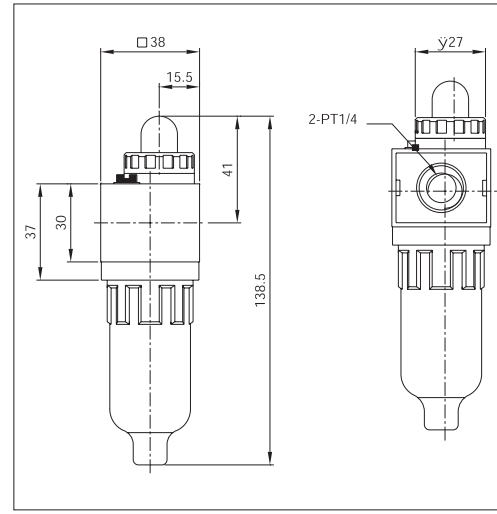
Model No	Unit	AL320	AL420
Port size		Rc 3/8"	Rc 1/2"
Gauge port		Rc 1/8	
Fluid	MPa (bar)	Air	
Proof pressure	MPa (bar)	1.5 (15.0)	
Max supply pressure	MPa (bar)	1.0 (10.0)	
Temperature range	℃	0 ~ 60	
Lubrication		Turbin #1 (ISO VG32)	

Flow Characters



Dimensions

(Unit : mm)



Lubricator
AL320, AL420 Series

Symbol

ORDER KEY

AL — 320 — 10

Series
Lubricator

Body size

320	3/8"
420	1/2"

Port size

8	1/4"	AL320
10	3/8"	
15	1/2"	AL420

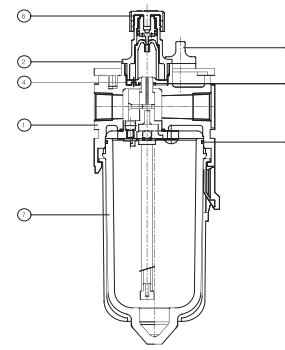
Specifications

Model No	Unit	AL320	AL420
Port size		Rc(PT)1/4", 3/8"	Rc(PT)1/2"
Fluid		Air	
Proof pressure	MPa (Bar)	1.5 (15.0)	
Max supply pressure	MPa (Bar)	1.0 (10.0)	
Temperature range	℃	0~60	
Filter element		Turbin #1 (ISO VG32)	
Weight	g	300	424

Component

No	Description	Material
1	Body	Aluminium
2	Trip Control Body	Brass / NBR
3	O-ring	NBR
4	Seal	NBR
5	Oil Cap	ABS
6	Knob	ABS
7	Bowl	ABS
8	Bowl O-ring	NBR
9	Bowl Guide	ABS

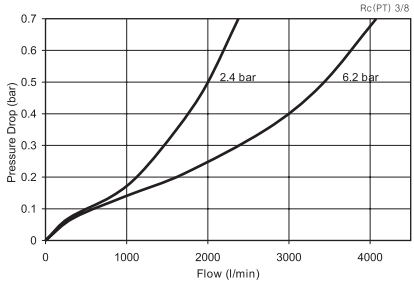
Constructions



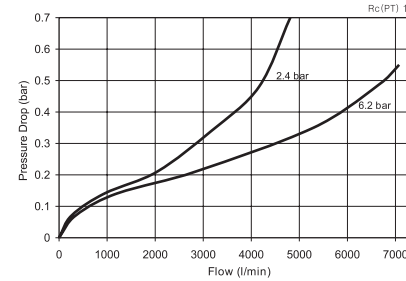
Lubricator

Flow Chart

AL320

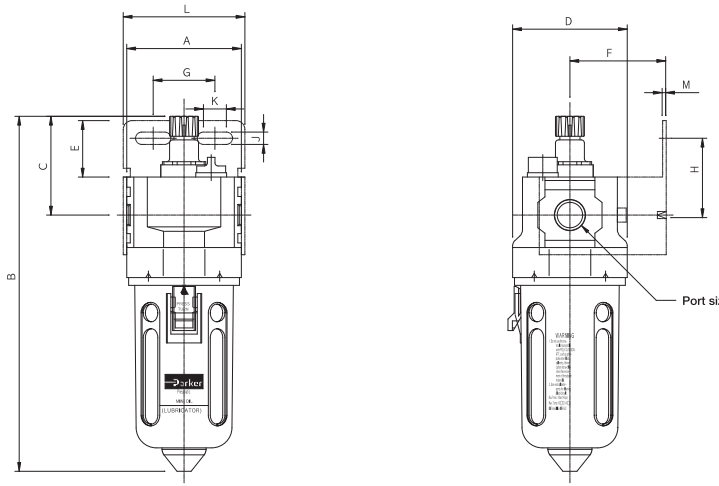


AL420



Dimensions

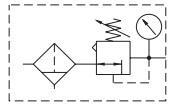
(Unit : mm)



Model No	A	B	C	D	Mounting							
					E	F	G	H	J	K	L	M
AL320	65	198	56	65	32	50	35	45	7	13	69	2.3
AL420	80	216	56	80	32	50	50	45	7	13	85	2.3

Filter-Regulator
AFR200 Series

Symbol



ORDER KEY

AFR — 200 — 8 — AD20 — 40

Series
Filter Regulator

Body size

2	1/4"

Port size

8	1/4"

Drain options

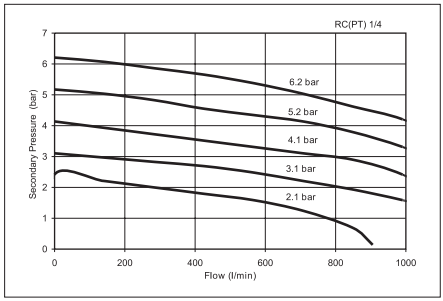
None	Manual Drain
AD20	Semi-Auto Drain

Filter element

None	5㎛
40	40㎛

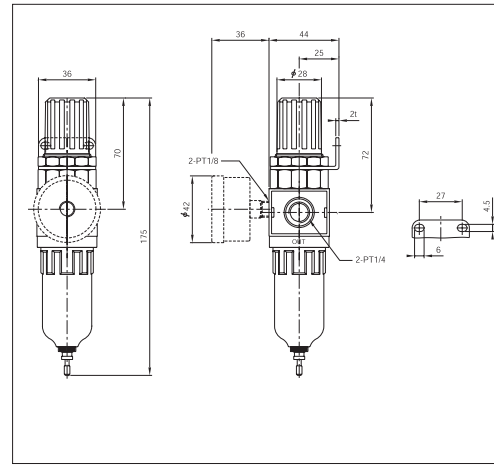
Model No	Unit	AFR200
Port size		Rc 1/4"
Proof Pressure	MPa (bar)	15.0 Bar
Max Pressure	MPa (bar)	10.0 Bar
Adjusting Pressure range	MPa (bar)	0.5 ~ 8.5 Bar
Temperature range	℃	0 ~ 60
Filter element	㎛	5 (Option : 40)
Construction		Relieving

Flow Characters



Dimensions

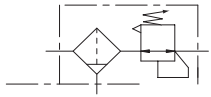
(Unit : mm)



Filter-Regulator

AFR320, AFR420 Series

Symbol



ORDER KEY

AFR — 320 — 10 — AD41 — 40

Series
Filter-Regulator

Body size

320	3/8"
420	1/2"

Port size

8	1/4"	AU320
10	3/8"	
15	1/2"	AU420

Drain options

None	Manual Drain
AD41	Auto Drain

Filter element

None	5㎛
40	40㎛

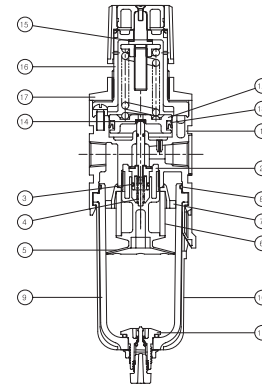
Specifications

Model No	Unit	AFR320	AFR420
Port size		Rc(PT) 1/4", 3/8"	Rc(PT) 1/2"
Proof pressure	MPa (Bar)	1.5 (15.0)	
Max supply pressure	MPa (Bar)	1.0 (10.0)	
Adjusting pressure range	MPa (Bar)	0.05~0.85 (0.5~8.5)	
Temperature range	℃	0~60	
Filter element	㎛	5	
Construciton		Relieving	
Weight	g	546	900

Component

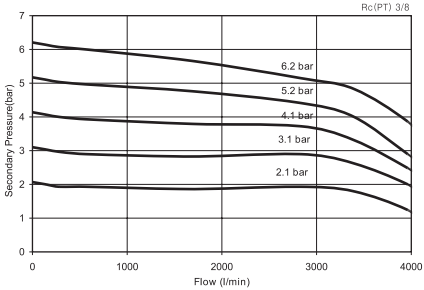
No	Description	Material
1	Body	Aluminium
2	Valve Ass'y	Bronze / NBR
3	Valve O-Ring	NBR
4	Valve Spring	SUS
5	Baffle	ABS
6	Element	ABS
7	Defletor	ABS
8	Bowl O-Ring	NBR
9	Bowl	ABS
10	Bowl Guide	ABS
11	Drain Ass'y	ABS
12	Piston Ass'y	ABS
13	Piston packing	NBR
14	Valve seat	NBR
15	Liner	ABS
16	Bonnet	ABS
17	Nut	ABS

Constructions

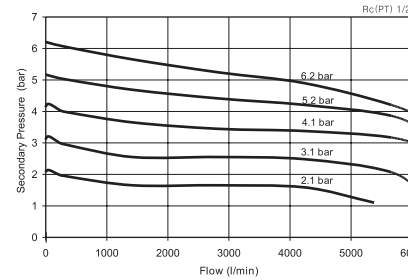


Flow Chart

AFR320

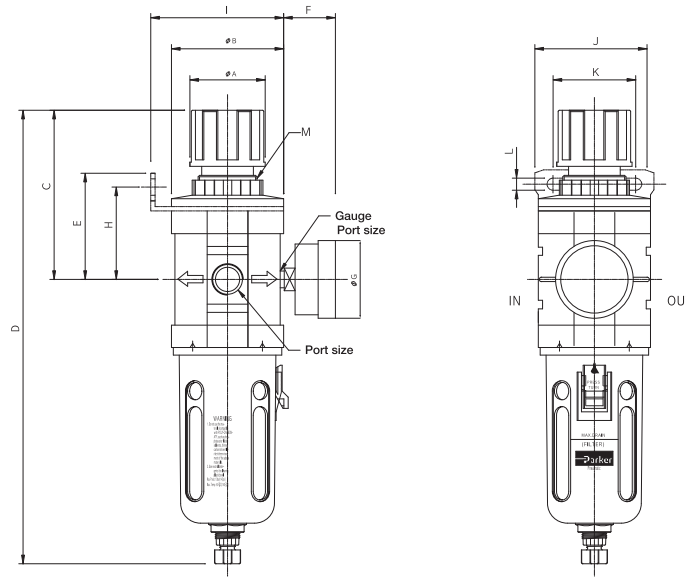


AFR420



Dimensions

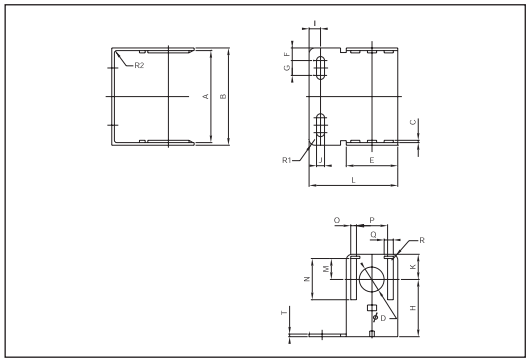
(Unit : mm)



Model No	Gauge port size Rc(PT)	Port size Rc(PT)	øA	øB	C	D	Mounting Bracket								M
							E	F	G	H	I	J	K	L	
AFR320	1/8	1/4, 3/8	42	65	96	246	61.5	30	45	53.5	77	69	48	7	M36×P1.5
AFR420	1/4	1/2	50	80	110	279	65	35	54	57	94.5	84	63	7	M42×P1.5

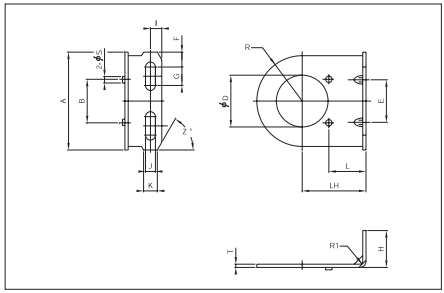
Accessory

AR / AFR Bracket



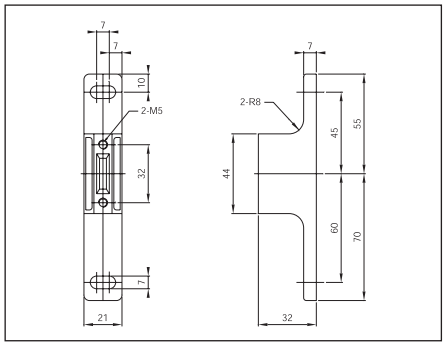
Part No	Series	A	B	C	ΦD	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	R1	R2	T
BKC 320	AL320, AF320	65.5	70.1	2	17.3	45	10.5	13	50	10	7	22	77.5	18.3	36	5	27.2	8	4	5	2	2.3
BKC 420	AL420, AF420	80	84.6	4	21.7	45	11	13	50	10	7	22	77.5	18.3	36	5	27.2	8	5	5	2	2.3

AR / AFR / AL Bracket



Part No	Series	A	B	ΦD	E	F	G	H	I	J	K	L	LH	R	R1	ΦS	T	Z*
BKL 320	AFR320, AR320	69	30.8	36.5	30	10.5	13	50	8	7	10	26.2	45	32	2	4.5	2.3	60
BKL 420	AFR420, AR420	84	36.8	42.5	40	10.5	13	50	8	7	10	33.3	55	39.5	2	4	2.3	60

AU Bracket



Part No.	Model No.
BKU320	AU320
BKU321	AU321
BKU420	AU420
BKU421	AU421

Parker
Pneumatic

Air Service Unit

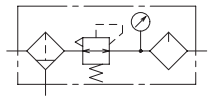
P3N Series

Air Service Unit

P3NCB, P3NCA Series

3 Combination Unit, 2 Combination Unit

Symbol



ORDER KEY

P3N [CB] [2] [8] S [G] [M] [N] [N] L [N] [B]

Type

CA	FR+L 2 Combination
CB	F+R+L 3 Combination

Thread Type

1	G(BSPP)
2	Rc(PT)
9	NPT

Port Size

6	¾
8	1
P	1-½ Port Block

Element

E	5㎛
G	40㎛

Drain Option

M	Manual Twist Drain
A	Auto Drain
S	Semi-Auto Drain
P	Push Drain

Regulator Adjustment Type

N	Relieving Type
M	Non-Relieving Type

Regulator Pressure Range & Gauge

L	0 ~ 4 bar	Without Gauge
N	0 ~ 8 bar	
H	0 ~ 17 bar	
G	0 ~ 8 bar	With Gauge

Lubricator Drain / Fill Devices

N	No Drain / Fill Plug
M	Manual Twist Drain / Fill Plug

Bracket

N	No Bracket
B	Wall Bracket

F.R.L Modular Combination

Specification

P3NCB

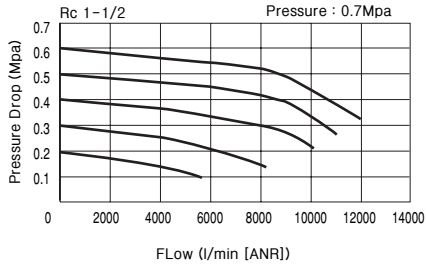
Model No.		Unit	P3NCB26	P3NCB28	P3NCB2P
Port Size		Rc(PT), NPT,	¾	1	1-½
Gauge Port Size		BSPP(G)	¼		
Fluid			Air		
Filter Element		㎛	5(Standard), 40(Option)		
Max. Pressure		Mpa(bar)	1.7(17)		
Max. Operationg Pressure		Mpa(bar)	30		
Working Temperature		℃	0-80		
Drain Capacity		Cm^3	200		
Oil Storage Capacity		Cm^3	530		
Recommended Oil			Turbine Oil(ISO VG 32)		
Component Parts	Filters	1	P3NFA26	P3NFA28	P3NFA28
	Regulator	1	P3NRA26	P3NRA28	P3NRA28
	Lubricator	1	P3NLA26	P3NLA28	P3NLA28
	Port Block Kit	2			P3NKB2BCL

P3NCA

Model No.		Unit	P3NCA26	P3NCA28	P3NCA2P
Port Size		Rc(PT), NPT,	¾	1	1-½
Gauge Port Size		BSPP(G)	¼		
Fluid			Air		
Filter Element		㎛	5(Standard), 40(Option)		
Max. Pressure		Mpa(bar)	1.7(17)		
Max. Operationg Pressure		Mpa(bar)	30		
Working Temperature		℃	0-80		
Drain Capacity		Cm^3	200		
Oil Storage Capacity		Cm^3	530		
Recommended Oil			Turbine Oil(ISO VG 32)		
Component Parts	Filters	1	P3NEA26	P3NEA28	P3NEA28
	Regulator	1	P3NLA26	P3NLA28	P3NLA28
	Lubricator	2			P3NKB2BCL

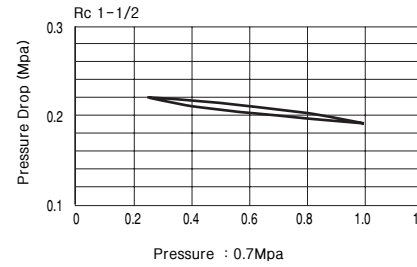
Flow Chart

P3NCB



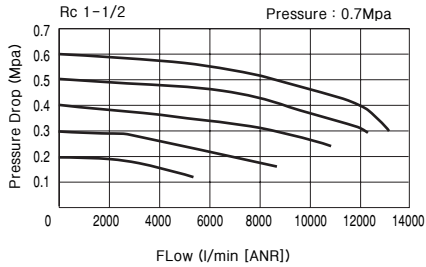
Pressure Chart

P3NCB



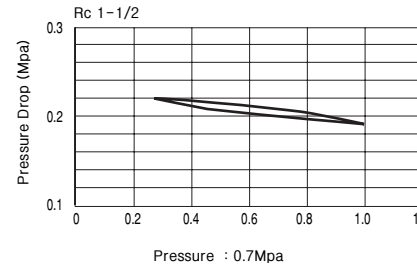
Flow Chart

P3NCA



Pressure Chart

P3NCA

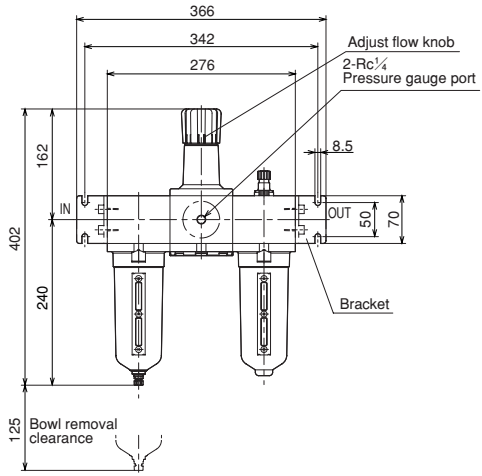


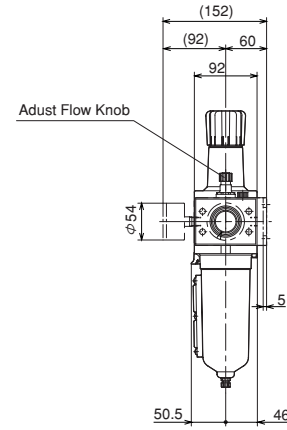
F.R.L Modular Combinaiton

Dimension

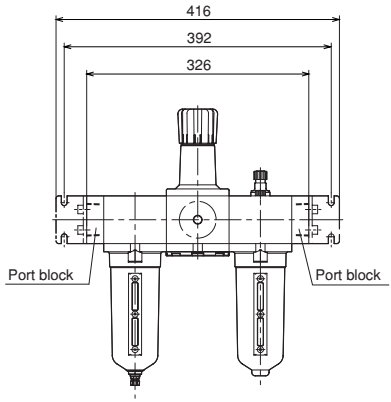
(Unit : mm)

P3NCB□6
P3NCB□8





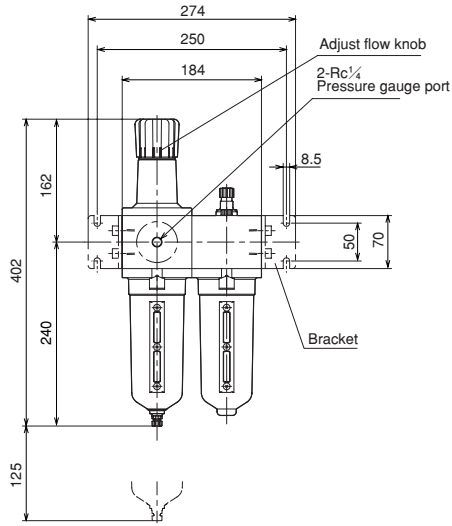
P3NCB□P

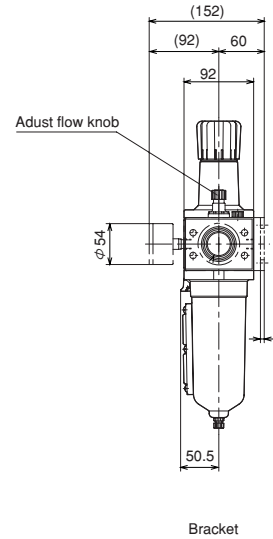


Dimension

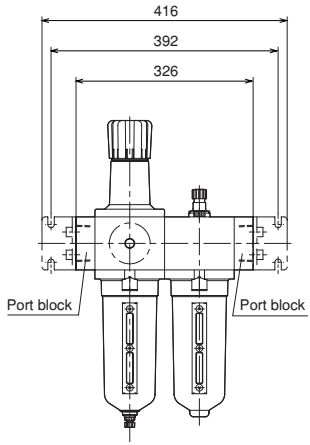
(Unit : mm)

P3NCA□6
P3NCA□8



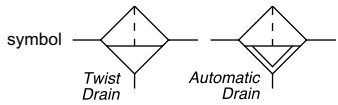


P3NCA□P



Filter

P3NFA26, P2NFA28 Series



ORDER KEY

P3N FA 2 8 G S M

Series

Type
Filter-Regulator

Port Type

1	G(BSPP)
2	RcPT
9	NPT

Port Blocks

6	3/4"
8	1"
P	1-1/2

Drain

M	Manual Twist Drain
A	Auto Drain
P	Semi-Auto Drain
S	Push 'N' Drain

Bowl

S	Metal Bowl w/Sight Gauge

Element

A	Adsorber	w/o DPI
E	5 W	
G	40 W	
F	5 W	w/ DPI
H	40 W	

Specifications

Model No	Unit	P3NFA26	P3NFA28	P3NFA28
Port Size		3/4"	1"	1-1/2"
Element	㎛	5(Standard) / 40(Option) / Adsorber(Option)		
Max. Pressure	Mpa (bar)	1.7 (17)		
Working Temperature	℃	0~80		
Weight	kg	1.6	1 6	2.1

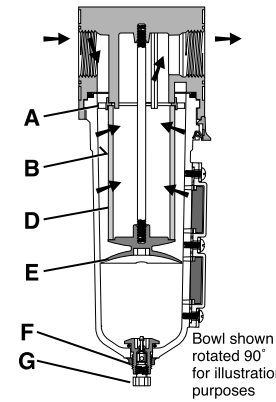
Operation

Air enters at inlet port and flows through deflector(A) which causes a swirling action. Liquids and large particles are forced to the bowl interior wall(B) by centrifugal action of the swirling air.

Then they carry down the bowl wall by the force of gravity.

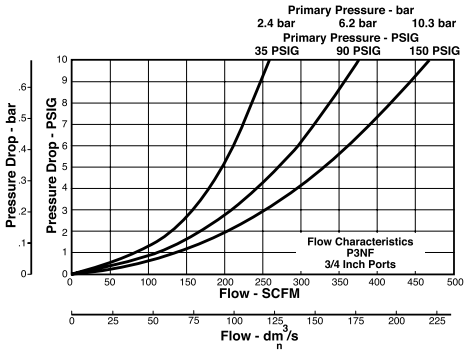
The baffle(E) separates the lower portion of the bowl where the liquid and particles are collected, unaffected by the swirling air and are therefore not reentrained into the flowing air. After liquids and large particles are removed, the air flows through element(D) where smaller particles are filtered out and retained. The filtered air then passes downstream. Collected liquids and particles in the lower portion of the bowl should be drained before their level reaches a where they would be reentrained in the flowing air. This can be accomplished by the manual drain(F) which is actuated by twising the drain nut(G)

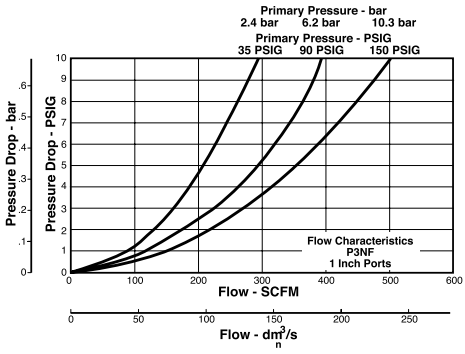
Construction

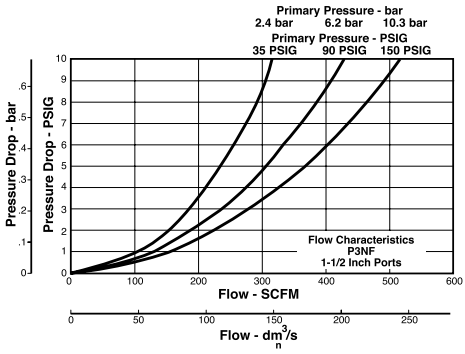


P3NF

Flow Characteristics

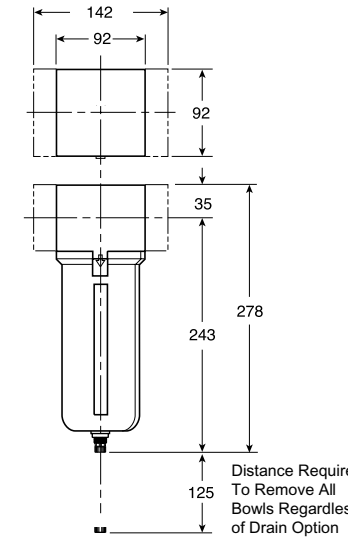






Dimensions

(Unit : mm)



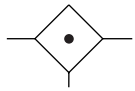
Spare Parts

Name		Model No
Bowl Kits	40 Micron	P3NKA00ESG
	5 Micron	P3NKA00ESE
	Adsorber	P3NKA00ESA
Sight Gauge Kits		P3NKA00PE
Bowl Kits	w/Manual Twist Drain	P3NKA00BSM
	w/Auto Drain	P3NKA00BSA
	w/Semi-Auto Drain	P3NKA00BSS
	w/Push 'N' Drain	P3NKA00BSP

Coalescing Filter

P3NFA Series

Symbol



ORDER KEY

P3N FA 2 8 D S M

Series

Type
Filter

Port Type

1	G(BSPP)
2	Rc(PT)
9	NPT

Port Size

6	3/4"
8	1"
P	1-1/2

Element

C	Grade 6	w/o DPI Gauge
9	Grade 10	
D	Grade 6	w/ DPI Gauge
Q	Grade 10	

Bowl

S	Metal Bowl w/Sight Gauge

Drain

M	Manual Twist Drain
A	Auto Drain
S	Semi-Auto Drain
P	Push 'N' Drain

Specifications

Model No		Unit	P3NFA26	P3NFA28	P3NFA28
Port Size			3/4"	1"	1-1/2"
Element	Grade 6	μm	0.3		
	Grade 10		0.7		
Max. Pressure		Mpa(bar)	1.7(17.0)		
Working Temperature		℃	0~80		
Weight		kg	1.6	1.6	2.1

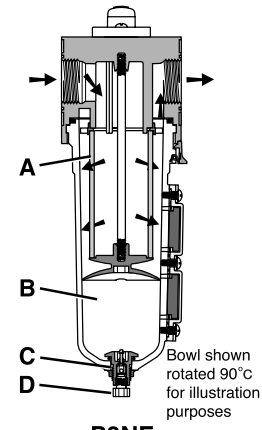
Operation

The contaminated air enters the element interior and is forced through a thick membrane of borosilicate glass fibers coated with epoxy(A). Flow then passes through an outer structural support and, at this stage, has removed 99.9%+of the sub-micron particles evident in the contaminated air. These tiny droplets coalesce together and are blotted from the filter surface by the drain and release layers of non-woven glass felt and rayon cloth. The droplets now begin a gravitional passage to the filter sump where they can be manually or automatically drained.

The filtered air now passes through and out into the pneumatic system. The Coalescing Filter removes liquid aerosols and submicron particulate matter.

Collected liquids and particles in the "quiet zone" should be drained before their level reaches a height where they would be reentrained in the flowing air.

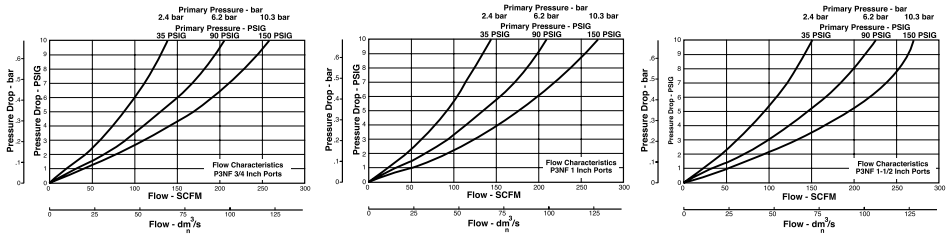
Construction



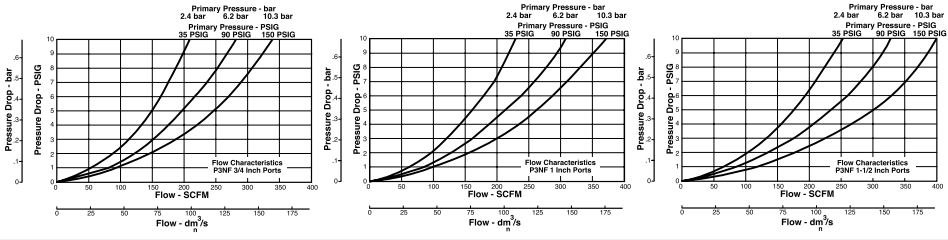
P3NF

Flow Characteristics

Grade 6

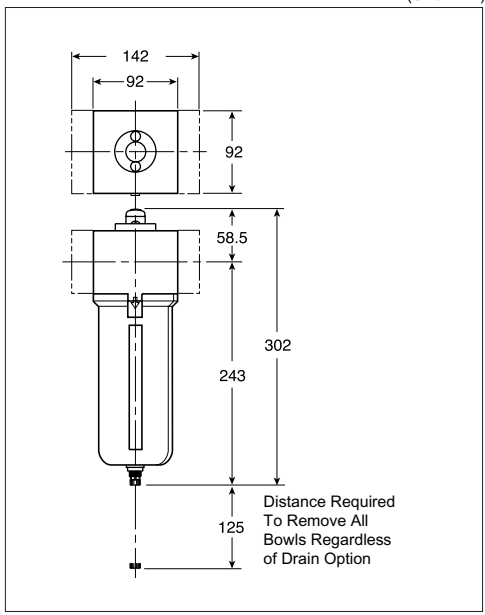


Grade 10



Dimensions

(Unit : mm)



Spare Parts

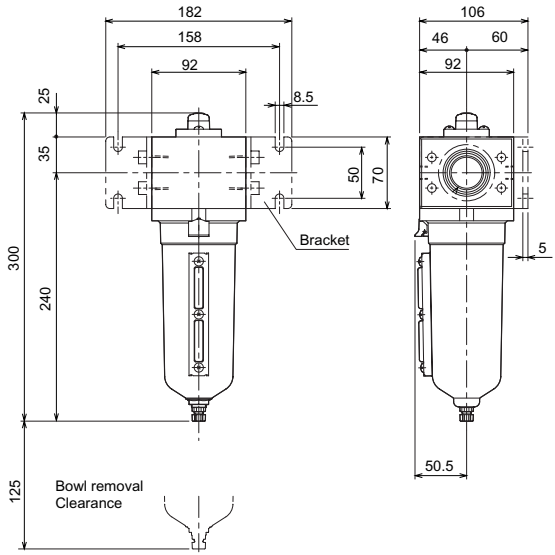
Name		Model No
Element Kits	Grade 6	P3NKA00ESC
	Grade 10	P3NKA00ES9
Sight Gauge Kits		P3NKA00PE
Bowl Kits	w/Manual Twist Drain	P3NKA00BSM
	w/Auto Drain	P3NKA00BSA
	w/Semi-Auto Drain	P3NKA00BSS
	w/Push 'N' Drain	P3NKA00BSP

Coalescing Filter

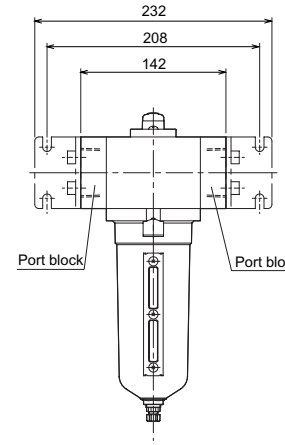
Dimension

(Unit : mm)

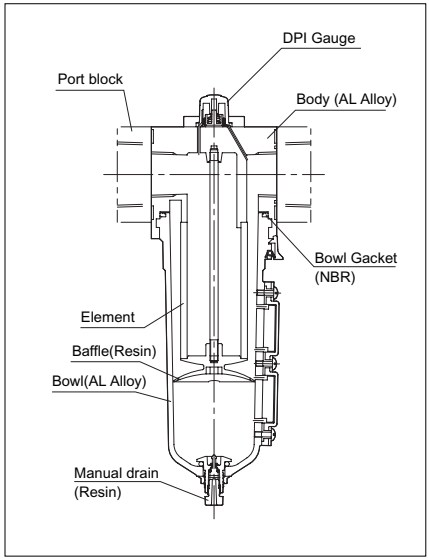
P3NFA□6
P3NFA□8



P3NFA□P



Construction Gauge



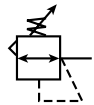
Spare Parts

Name		Order key
Element	Grade 6	P3NKA00ESC
	Grade 10	P3NKA00ES9

Regulator

P3NRA Series

symbol



ORDER KEY

P3N RA 2 8 B N N

Series

Type
Regulator

Port Type

1	G(BSPP)
2	Rc(PT)
9	NPT

Port Size

6	3/4"
8	1"
P	1-1/2

Regulator Type

B	Relieving
N	Non-Relieving

Adjustment

N	Non-Rising Knob

Pressure Range & Gauge

L	60PSI (0 to 4bar)	w/o Gauge
N	125PSI (0 to 8bar)	
H	250PSI(0 to 17bar)	
G	250PSI(0 to 17bar)	w/ Gauge

Specifications

Model No	Unit	P3NRA26	P3NRA28	P3NRA2P
Port Size		3/4"	1"	1-1/2"
Gouge Port size		1/4"		
Fiuid		Air		
Pressure Range	Mpa(bar)	1.7 (17)		
Working Temperature	℃	0~80℃		
Regulator Type		Relieving / Non-Relieving		
Weight	Kg	1.5	1.5	2

Operation

Turning the knob clockwise applies a load to control spring(C). This load causes the piston(D) and the valve poppet assembly(B) to move downward allowing flow across the seat area(E).

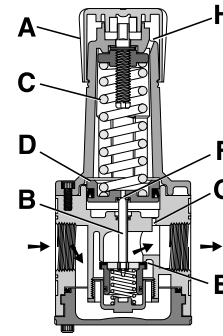
Pressure in the downstream line is sensed below the control piston(D) and offsets the load of spring(C). As downstream pressure rises, poppet assembly(B) and control piston(D) move upward until the seat area(E) is closed and the load of the spring(C) and pressure under piston(D) are in balance. A reduced outlet pressure has now been obtained, depending on spring load.

Creating a demand downstream, such as opening a valve, results in a reduced pressure under the control piston(D). The load of control spring(D) now causes the poppet assembly to move downward opening seat area(E) and allowing air to flow to meet downstream demand. The flow of downstream air is metered by the amount of opening.

If downstream pressure exceed the desired regulated pressure, the excess pressure will cause the control piston(D) to move upward against control spring(C), open vent hole(F), and vent the excess pressure to atmosphere through the hole in the bonnet(H).

(This occurs in the standard relieving type regulator only.)

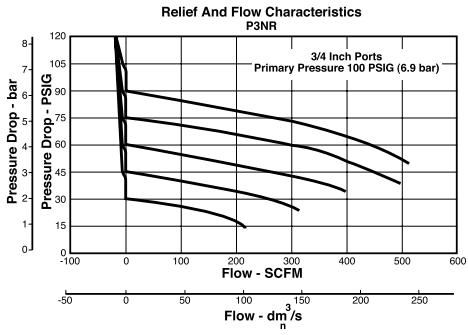
Construction

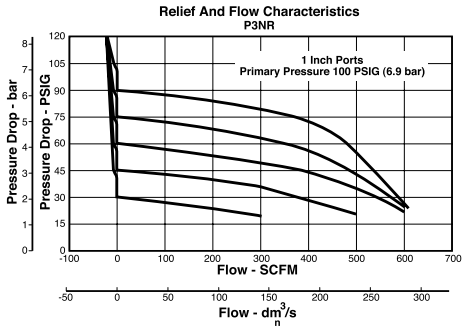


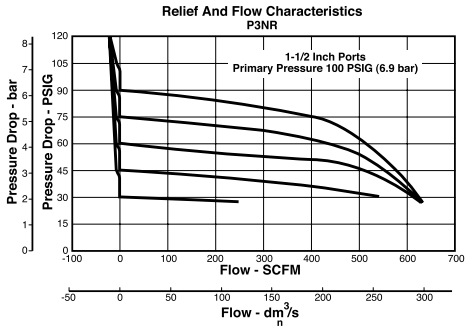
P3NR

Regulator

Flow Characteristics

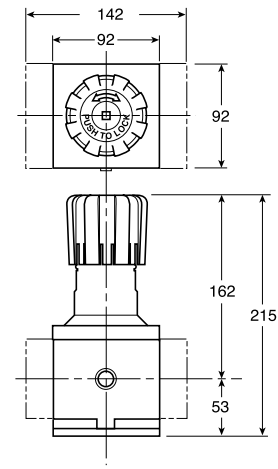






Dimensions

(Unit : mm)



Spare Parts

Name		Model No
Control Knob		P3NKA00PN
Repair Kits	Relieving Type	P3NKA00RR
	Non-Relieving Type	P3NKA00RN

Pilot Regulator

P3NRA26, P3NRA28 Series

symbol

ORDER KEY

P3N RA 2 8 B P P

Series

Type
Pilot Regulator

Port Type

1	G(BSPP)
2	Rc(PT)
9	NPT

Port Size

6	3/4"
8	1"
P	1-1/2

Pressure Range & Gauge

P	Pilot Operated	w/o Gauge
G	125PSI (0 to 8bar)	w/ Gauge

Adjustment

P	Pilot operated

Regulator Type

B	Relieving
N	Non-Relieving

Specifications

Model No	Unit	P3NRA26	P3NRA28	P3NRA2P
Port Size		3/4"	1"	1-1/2"
Gouge Port size		1/4"		
Fluid		Air		
Pressure Range	Mpa(ber)	1.7 (17)		
Working Temperature	°C	0~80°C		
Regulator Type		Relieving / Non-Relieving		
Weight	Kg	1.5	1.5	2

Operation

Pressurizing the pilot port applies a load to control piston(D). This load causes the piston(D) and the valve poppet assembly(B) to move downward allowing flow across the seat area(E).

Pressure in the downstream line is sensed below the control piston(D) and offsets the load of piston(D). As downstream pressure rises, poppet assembly(B) and control piston(D) move upward until the seat area(E) is closed and the load of the piston(D) and pressure under piston(D) are in balance. A reduced outlet pressure has now been obtained.

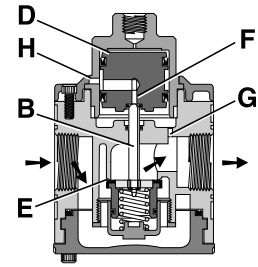
Creating a demand downstream, such as opening a valve, results in a reduced pressure under the control piston(D). The load of control piston(D) now causes the poppet assembly to move downward opening seat area(E) and allowing air to flow to downstream.

The flow of downstream air is metered by the amount of opening(E).

If downstream pressure exceed the desired regulated pressure, the excess pressure will cause the control piston(D) to move upward against opening vent hole(F), and vent the excess pressure to atmosphere through the hole in the bonnet(H).

(This occurs in the standard relieving type regulator only.)

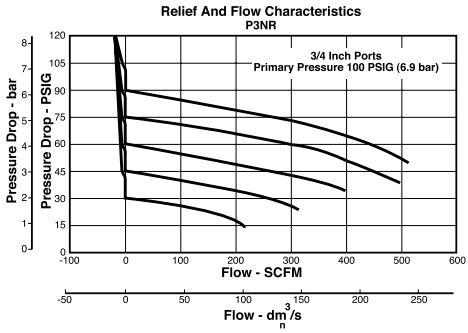
Construction

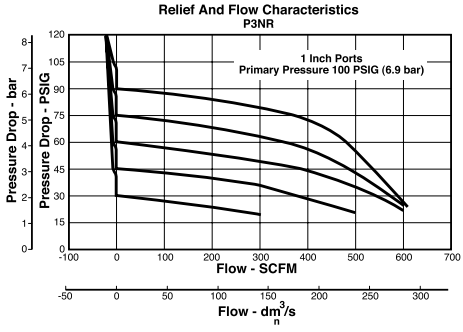


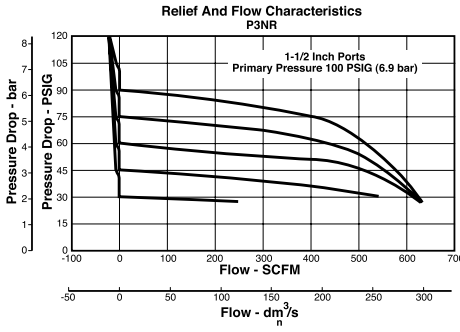
P3NR Air Pilot

Pilot Regulator

Flow Characteristics

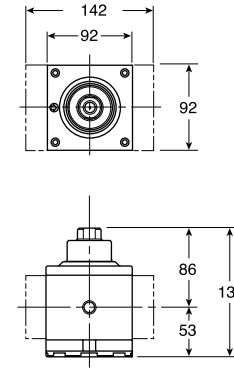






Dimensins

(Unit : mm)



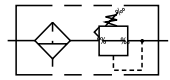
Spare Parts

Name		Model No
Control Knob		P3NKA00PN
Repair Kits	Relieving Type	P3NKA00RR
	Non-Relieving Type	P3NKA00RN

Filter-Regulator

P3NEA26 Series

Symbol



ORDER KEY

P3N EA 2 8 G S M B N N

Series

Type
Filter-Regulator

Port Type

1	G(BSPP)
2	Rc PT
9	NPT

Port Size

6	3/4"
8	1"
P	1-1/2 Port Blocks

Fiter Element

A	Adsorber
E	5 W
G	40 W

Bowl

S	Metal Bowl w/Sight Gauge

Drain

M	Manual Twist Drain
A	Auto Drain
S	Semi-Auto Drain
P	Push 'N' Drain

Regulator Type

B	Relieving
N	Non-Relieving

Adjustment

N	Non-Rising Knob

Pressure Range & Gauge

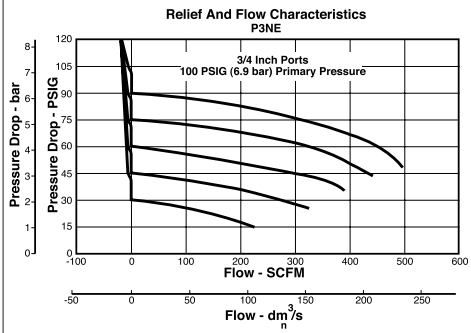
L	60PSI(0 to 4 bar)	w/o Gauge
N	125PSI(0 to 8 bar)	
H	250PSI(0 to 17 bar)	
G	125PSI(0 to 8 bar)	w/ Gauge

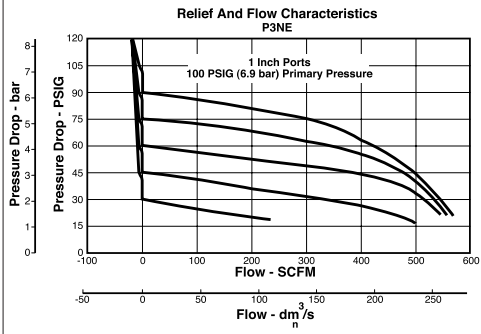
Specifications

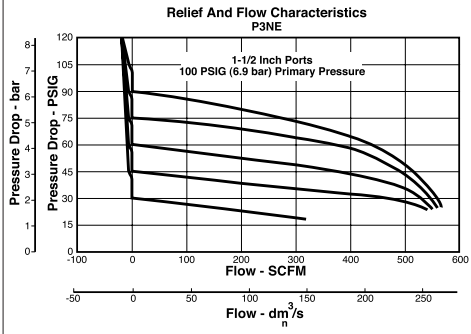
Model No	Unit	P3NEA26	P3NEA28	P3NEA2P
Port Size		3/4"	1"	1-1/2"
Pressure Range	Mpa	1.7 (17)		
Working Temperature	℃	0~80		
Element	㎛	5(Standard) / 40(Option) / Adsorber(Option)		
Weight	kg	2.4	2.4	2.9

Filter Regulator

Flow Characters

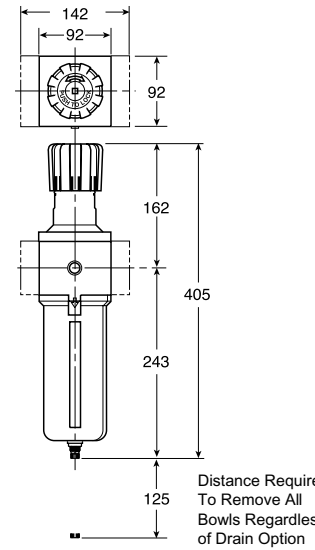






Dimensions

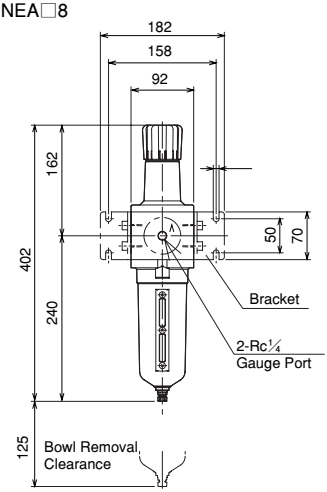
(Unit : mm)

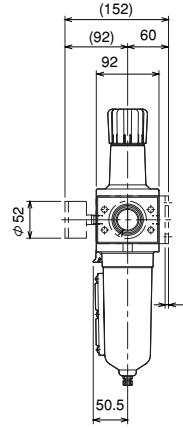


Dimension

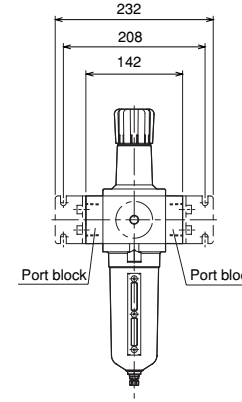
(Unit: mm)

P3NEA□6
P3NEA□8

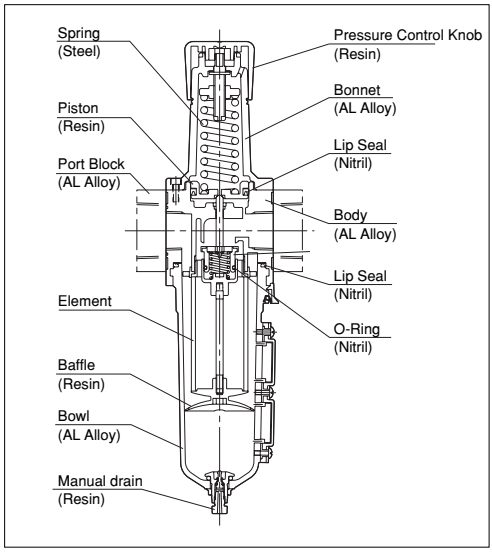




P3NEA□P



Construction



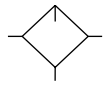
Spare Parts

Name		Model No.
Element Kit	40 ㎛	P3NKA00ESG
	5 ㎛	P3NKA00ESE
	Absorber	P3NKA00ESA

Lubrcator

P3NAL Series

symbol



ORDER KEY

P3N LA 2 8 L S N

Series

Type
Lubricator

Port Type

1	G(BSPP)
2	Rc(PT)
9	NPT

Port size

6	3/4"
8	1"
P	1-1/2

Drain / Fill Devices

N	No Drain/Fill Plug
M	Manual Twist Drain/Fill Plug

Bowl

S	Metal Bowl w/Sight Gauge

Lubricator Type
Oil Mist

L	w/Polycarbonate Sight Dome

Specifications

Model No	Unit	P3NLA26	P3NLA28	P3NLA2P
Port Size		3/4"	1"	1-1/2"
Fluid		Air		
Pressure Range	Mpa (bar)	1.7 (17)		
Working Temperature	℃	0~80℃		
Recommerded oil		Turbime oil (ISO VG32)		
Weight	kg	1.6	1.6	2.1

Operation

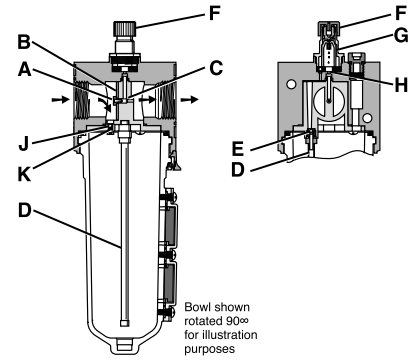
Air flowing through the unit goes through two paths. At low air flow rates, the majority of the air flows through venturi section(A). The rest of the air slightly deflects and flows by the flapper(B). The velocity of the air flowing through venturi section(A) creates a pressure drop at throat section(C).

This lower pressure allows oil to be forced from the reservoir through the pickup tube(D) past the check ball(E) to the dome asembly where the rate of oil flow is controlled by knob(F).

Then oil flows through the clearance between inner and outer sight domes(G) where drops are formed and drip into the throat section(H). Here it is then broken into fine particles and mixed with the swirling air to be carried to the venturi outlet where it joins the air by passing the flapper(B).

The check ball(E) assures that when there is no flow, the oil in the pickup tube does not return to the reservoir.

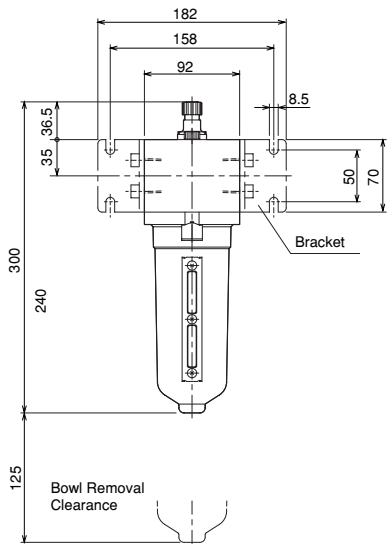
Construction

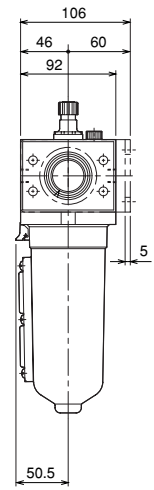


Dimension

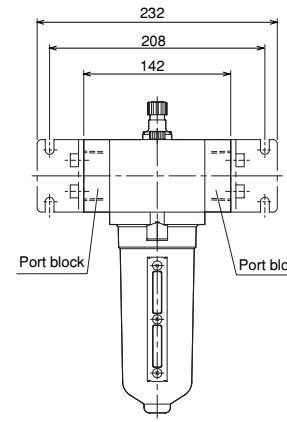
(Unit : mm)

P3NLA□6
P3NLA□8

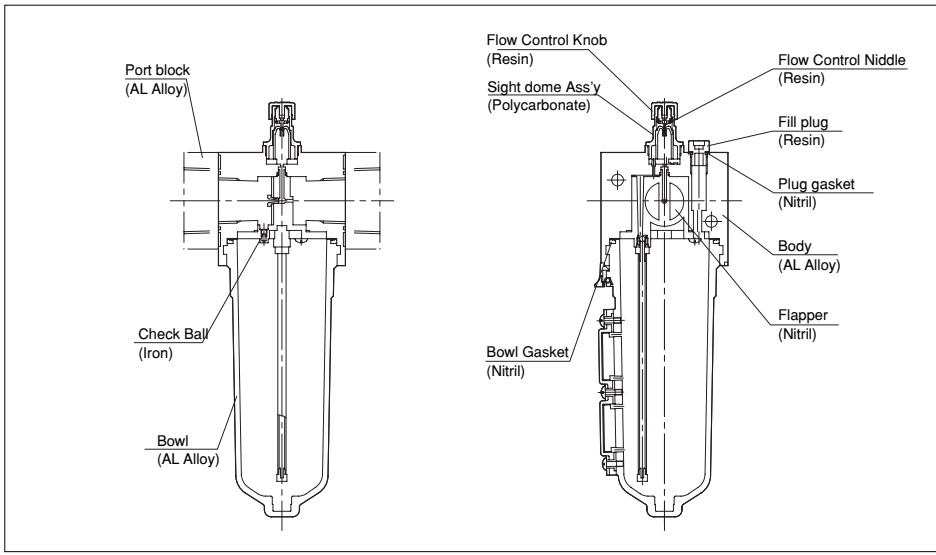




P3NLA□P



Construction



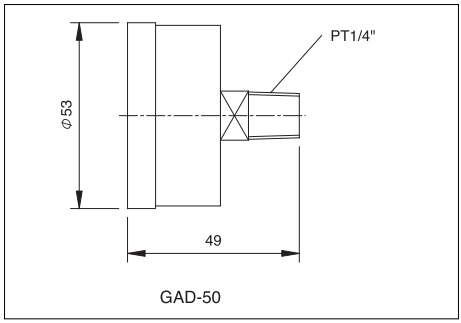
Accessories

Symbol

Specifications

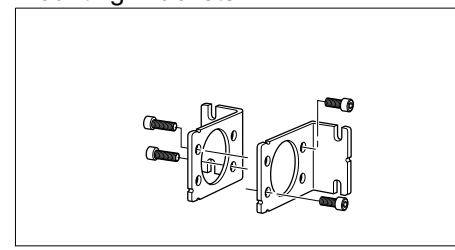
Model No	Port Size	Applicable Model	Pressure Range
GAD50-10	1/4	P3N	0~10 bar
GAD50-20	1/4	P3N	0~20 bar

Dimensions



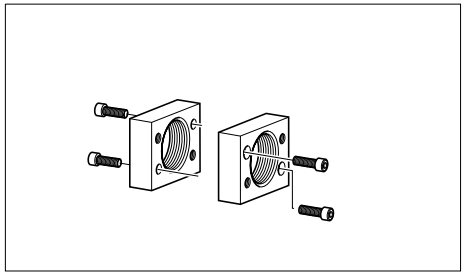
GAD-50

Mounting Brackets



3/4", 1	1-1/2"
P3NKA00MW	P3NKB00MW

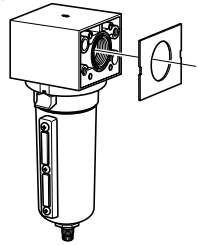
Port Block Kits



	3/4"		1"		1-1/2"	
BSPP	P3NKB16CP	P3NKB16CL	P3NKB18CP	P3NKB18CL	P3NKB1BCP	P3NKB1BCL
RcPT	P3NKB26CP	P3NKB26CL	P3NKB28CP	P3NKB28CL	P3NKB2BCP	P3NKB2BCL
NPT	P3NKB96CP	P3NKB96CL	P3NKB98CP	P3NKB98CL	P3NKB9BCP	P3NKB9BCL

Body Cover

Model No : P3NKA00PM



Parker
Pneumatic

Air Unit Accessory

Pressure Gauge / Gray Color

AGRP Series

Specification

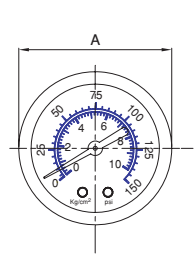
Model	Unit	AGRP
Body Color		Gray
Fluid		Air
Accuracy	%	±2.5 (B Class ANSI B40.1)
Temperature Range	℃	-20 ~ 60
Meterial	Case	Brass
	Port	Brass
	Cover	Glass

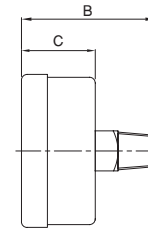
ORDER KEY

Order No.	Pressure Range	Cover Size	Port Size
AGRP-95-227	0 ~ 10 bar	Φ40	PT⅛
AGRP-96-669	0 ~ 10 bar	Φ50	PT¼

Dimension

(Unit : mm)





Cover Size	A	B	C	D	E	W	T
Φ40	41.6	38.8	24.0	22.7	8.3	11	PT⅛
Φ50	52.8	48.5	26.4	26.4	9.3	14	PT¼
Φ63	63.2	53.1	31.6	29.8	9.8	14	PT¼

Pressure Gauge / Black Color

GAD Series

Positive / Negative / Pannel / Vertical Type

Specification

Model	Unit	GAD
Body Color		Black
Fluid		Air
Accuracy	%	±2.5 (B Class ANSI B40.1)
Temperature Range	℃	-20 ~ 60
Meterial	Case	Brass
	Port	Brass
	Cover	Glass

ORDER KEY

GAD 40 - 10 -

① ② ③ ④ ⑤

1. Shape

No mark	General
P	Pannel Type

2. Pressure

No mark	Positive
V	Negative(vaccum)

3. Cover Size

Type	Size
40	Φ40
50	Φ50
60	Φ60

4. Pressure Range

Type	Pressure Range
4	0~4 bar
7	0~7 bar
10	0~10 bar
20	0~20 bar
V1	0~-760mmHg

5. Thread Direction

No mark	Back side thread (Standard)
A	Vertical sid Thread

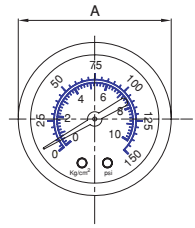
Model	Pressure Range	Cover Size	Port Size	Remark
GAD40-4	0 ~ 4 bar	Φ40	PT 1/8	General
GAD40-7	0 ~ 7 bar			
GAD40-10	0 ~ 10 bar			
GAD50-10	0 ~ 10 bar	Φ50	PT 1/4	
GAD50-20	0 ~ 20 bar			
GAD63-10	0 ~ 10 bar	Φ63	PT 1/4	
VGAD40-V1	0 ~ -760 mmHg	Φ40	PT 1/8	Negative (Vaccum)
VGAD50-V1	0 ~ -760 mmHg	Φ50	PT 1/4	
VGAD63-V1	0 ~ -760 mmHg	Φ63	PT 1/4	
PGAD40-10	0 ~ 10 bar	Φ40	PT 1/8	Pannel
PGAD50-10	0 ~ 10 bar	Φ50	PT 1/4	
PGAD63-10	0 ~ 10 bar	Φ63	PT 1/4	
PVGAD40-V1	0 ~ -760 mmHg	Φ40	PT 1/8	Pannel Vaccum
PVGAD50-V1	0 ~ -760 mmHg	Φ50	PT 1/4	

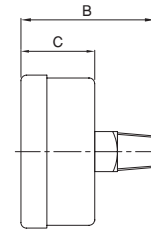
Pressure Gauge

Dimension

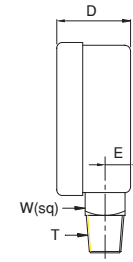
(Unit : mm)

Standard



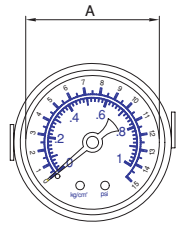


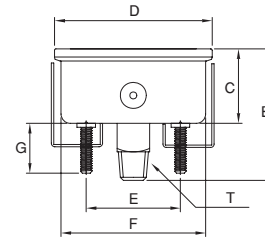
Vertical side Thread Type



Cover Size	A	B	C	D	E	W	T
Φ40	41.6	38.8	24.0	22.7	8.3	11	PT⅛
Φ50	52.8	48.5	26.4	26.4	9.3	14	PT¼
Φ63	63.2	53.1	31.6	29.8	9.8	14	PT¼

Pannel Type





Cover Size	A	B	C	D	E	F	G	T
Φ40	39.6	41.5	26.6	43.7	28.6	40.5	10.2	PT⅛
Φ50	48.0	49.9	27.6	57.2	35.8	50.5	21.7	PT¼
Φ63	58.0	58.4	33.9	67.7	40.5	62.1	21.7	PT¼

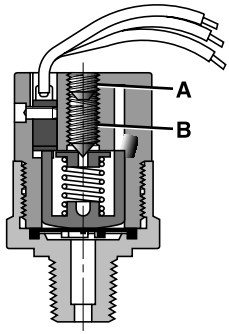
Pressure Switch

P01908 Series

Specifications

	Unit	P01908
Port Size		PT 1/4"
Max.Inlet pressurer range	MPa(bar)	2(20)
Adjustable pressure range	MPa(bar)	0.21~1.05(2.1~10.5)
Voltage		5A,12/24VDC,125/250VAC
Temperature range	℃	-40~80
Repeatability		±2% at 20℃ Ambient
Life time		20,000,000 at 5 bar
Weight	kg	0.11

Constructions



The pressure switch monitors the air pressure in your pneumatic system. When the pressure in your system either drops below or exceeds the set point pressure, an electrical output is given.

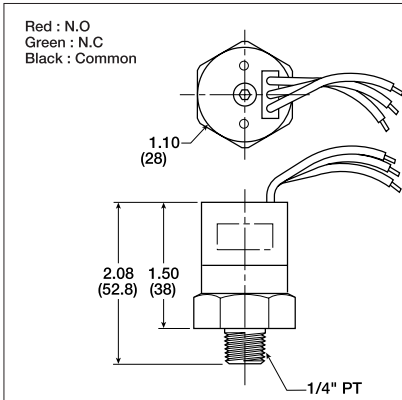
Remove screw (A) from the top of the switch. Using a 3mm hex wrench, turn the adjusting screw (B) clockwise to increase the pressure setting, replace screw (A). adjusting range of 0.21~1.05(2.1~10.5) bar.

Features:

- Inline mounting
- 5 amp rated snap action micro switch
- Brass boby
- Compact size
- Flying leads electrical connection
- Field adjustable 0.21~1.05(2.1~10.5)bar
- 2% repeatability
- Single pole/Double throw switch

Dimensions

Unit : inch (mm)



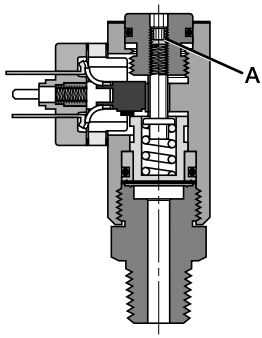
Pressure Switch

P01909 Series

Specifications

	Unit	P01909
Port Size		PT 1/4"
Max.Inlet pressurer range	MPa(bar)	2(20)
Adjustable pressure range	MPa(bar)	0.21~1.05(2.1~10.5)
Voltage		5A.12/24VDC.125/250VAC
Temperature range	℃	-40~80
Repeatability		±2% at 20℃ Ambient
Life time		20.000.000 at 5 bar
Weight	kg	0.06

Constructions



The pressure switch monitors the air pressure in your pneumatic system. When the pressure in your system either drops below or exceeds the set point pressure, an electrical output is given.

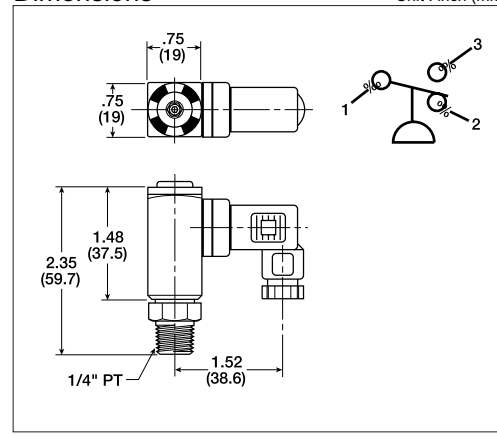
Using a 3mm hex wrench, turn the adjusting screw (A) clockwise to increase the pressure set point and counterclockwise to decrease the pressure setting. One complete revolution of the adjusting screw covers the complete Adjustment range of 0.21~1.05(2.1~10.5) bar.

Features:

- Inline mounting
- Dial indicator for easy pressure setting
- 5 amp rated snap action micro switch
- Heavy duty Aluminum components
- Compact size
- Din 43650HCM connector
- Field adjustable 0.21~1.05(2.1~10.5) bar
- Single pole/Double throw switch
- 2% repeatability

Dimensions

Unit : inch (mm)



Parker
Pneumatic

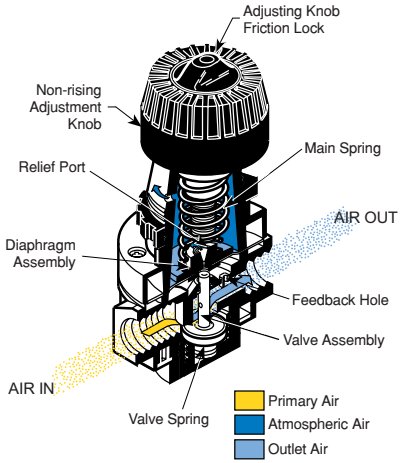
Pressure Controller

REGULATORS

General purpose

Used to provide a convenient and low cost method to reduce a supplied air pressure to a desired outlet prressure and transform a fluctuating air supply to a relatively constant reduced air pressure within the operating range of the regulator.

This type of regulator is generally used in a wide variety of applications where reduced pressure is highly desirable for energy conservation, safety requirements, air circuit control and air instrumentation.



Operation

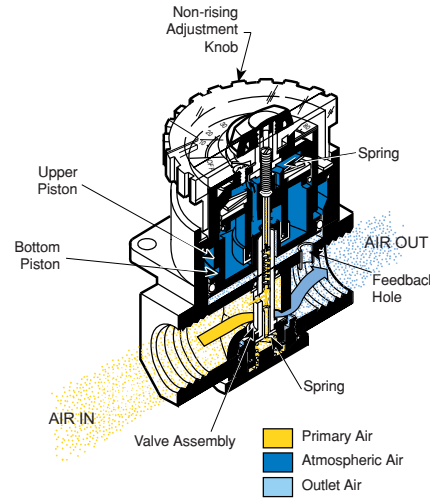
Turning the adjusting knob clockwise forces the main spring downward onto the flexible diaphragm which presses down onto the valve stem. The diaphragm and valve stem move downward forcing the balanced valve off its seat, which allows air to flow past the valve to the outlet side of the regulator and downstream to the air system. A precisely positioned aspirator tube communicates secondary pressure to the diaphragm resulting in instant compensation in order to maintain the desired secondary set pressure.

The diaphragm, valve stem and valve move upward, compressing the regulating main spring. Upward movement stops when the spring force acting on the diaphragm balances the pressure force acting below the diaphragm. For best performance, regulated pressure should always be set by increasing the pressure up to the desired setting.

Dial- Air™ Pilot

The Dial-Air™ Pilot is a constant bleed, piston operated regulator. The pilot controlled pressure reducing valve provides exceptionally high air flow with steady pressure control and minimal secondary pressure drop. The non-rising adjustment knob provides quick selection of the desired secondary pressure in less than one full turn. The adjustment knob also can serve as the pressure indicator thereby eliminating the need for a pressure gauge.

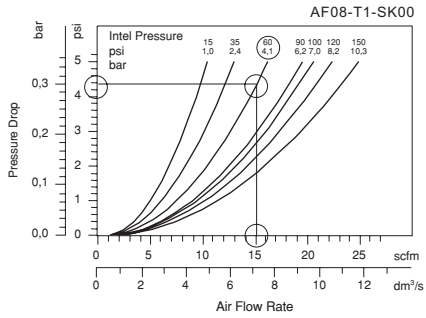
This regulator is specifically designed for applications requiring more accurate air circuit control, high air flow capacity with flat performance curves and quick regulator adjustment. The regulator can be used as a conventional regulator for standard air circuits or as a pilot regulator to provide pressure to the control chamber of a pilot operated(slave) regulator.



How You Read Flow Charts

Using Filter Graphs

1) From the graph select one of the inlet pressure curves to be used. 2.4 bar, 4.1 bar, etc.
2) Decide upon the air flow rate requirement for this application.(Refer to the horizontal air flow rate scale located at the bottom of the graph.)
3) To find the initial pressure drop draw a vertical line from the flow rate selected to a point where it crosses the inlet pressure curve. From this intersection draw a horizontal line to where it intersect the vertical pressure drop scale.



Note) Nℓ/min = scfm×28.57

Using Regulator Graphs

Note : Regulator graphs are based upon an inlet pressure of 6.9 bar.

Maximum flow capacity is measured at a point that is 75% of the initial secondary pressure setting.*(NFPA)

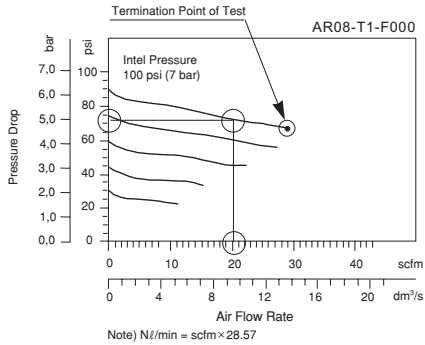
EXAMPLE :

Inlet Pressure = 6.9 bar, Secondary Pressure @ scfm = 6.2 bar.

Flow = 20 scfm, Secondary Pressure

@ 20 scfm = 5.2 bar Pressure Drop

@ 20 scfm = 1 bar.



Note) Nℓ/min = scfm×28.57

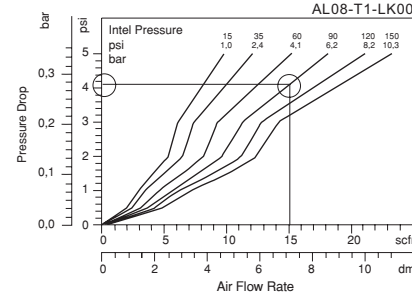
1) Using a graph selected by product family and pipe size pick the secondary pressure curve that fits your application.
2) Determine the air flow rate required from the air flow rate scale located at the bottom of the graph.
3) To find the pressure drop for this regulator draw a vertical line from the air flow rate selected to a point where it crosses the secondary pressure curve. From this intersection draw a horizontal line to where it intersects the vertical secondary pressure line. This is the secondary pressure at the flow rated selected to determine full pressure drop. Subtract this pressure from the original secondary pressure used.

The Difference = Pressure Drop

Using Lubricator Graphs

1) From the graph select one of the inlet pressure curves to be used. 2.4 bar, 4.1 bar. etc.
2) Decide the air flow rate requirement for this application.(Refer to horizontal air flow rate scale located at the bottom of the graph.)
3) To determine pressure drop draw a vertical line from the flow rate selected to the point where it crosses the inlet pressure curve used. From this intersection draw a horizontal line to where it intersects the vertical pressure drop scale.

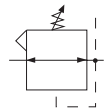
Note : Pressure drop value should not be less than 0.05 bar.



Note) Nℓ/min = scfm×28.57

Dial Regulator
R Series

Symbol



ORDER KEY

R21 – 02 – 0 0 0

Series

R11	1/4"
R21	1/4", 3/8",1/2", 3/4"
R31	3/4", 1", 1-1/4"
R41	1-1/2", 2"

Port size

02	1/4"
03	3/8"
04	1/2"
06	3/4"
08	1"
0A	1-1/4"
0B	1-1/2"
0C	2"

Option

O	High Flow
L	Low pressure
R	Remote controlled

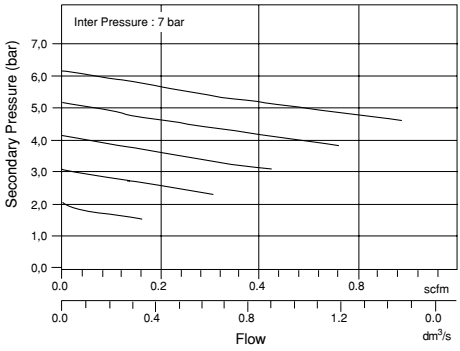
Note) R11 series: except R option

Specifications

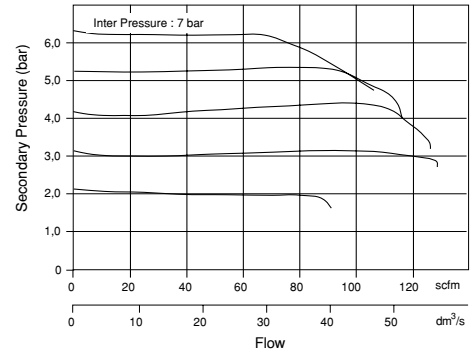
Model No		Unit	R11	R21	R31	R41
Flow	1/4	l/min (ANR)	23	3,343	-	-
	3/8		-	5,143	-	-
	1/2		-	5,571	-	-
	3/4		-	6,285	11,428	-
	1		-	-	18,570	-
	1-1/4		-	-	20,000	-
	1-1/2		-	-	-	45,712
	2		-	-	-	45,712
Gauge port		NPT/BSPP	1/4"			
Fluid			Air			
Max.operating pressure		MPa(bar)	2.0 (20.7)			
Max.operatingTemperature		℃	65.5			
Adjusting pressure range		MPa(bar)	Low pressure 0~0.28 (0~2.8)			
			Standard pressure 0~1.1(0~11)			
weight		kg	0.5	1.04	1.8	4.1
Contructions	Body		Zinc			
	Bonnet		Zinc / Brass			
	Piston		Acetal			
	Valve Ass'y		Brss/ NBR/ Acetal			
	Spring		Steel			
	Seals		NBR			

Flow Characters

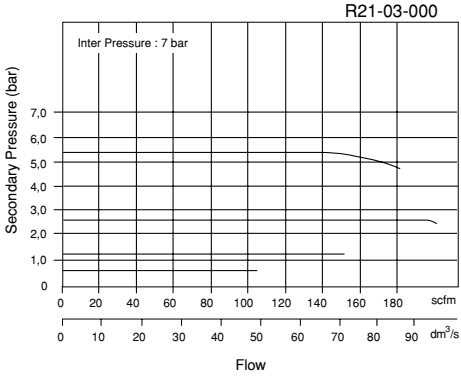
R11-02-000



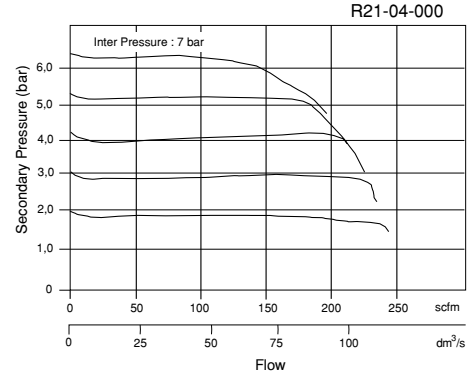
R21-02-000



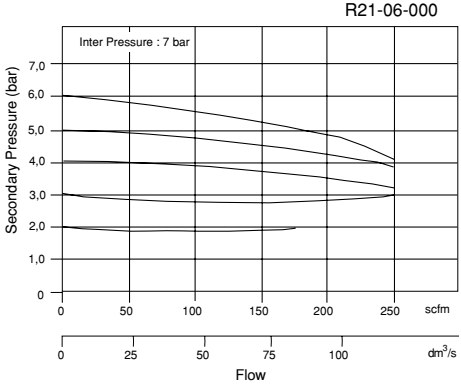
R21-03-000



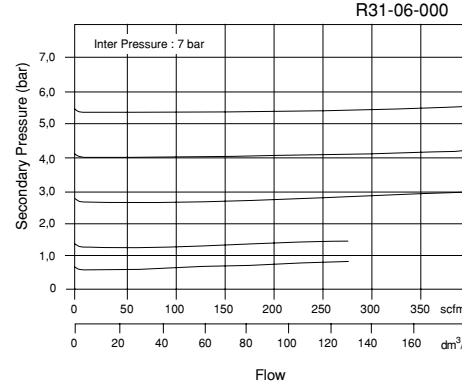
R21-04-000



R21-06-000



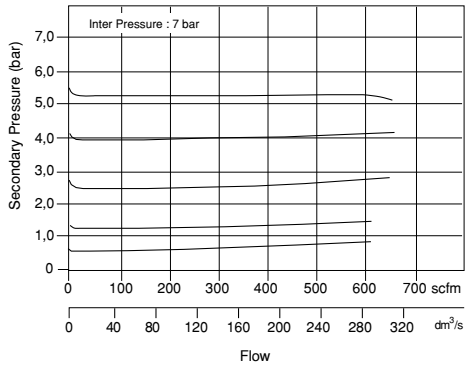
R31-06-000



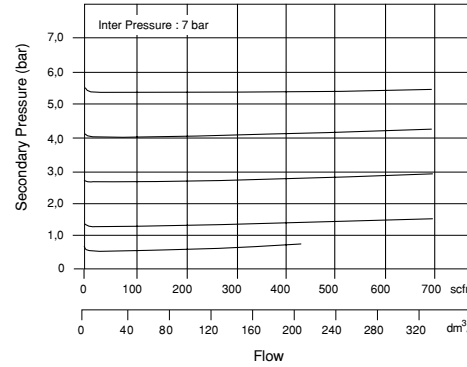
Dial Regulator

Flow Caracters

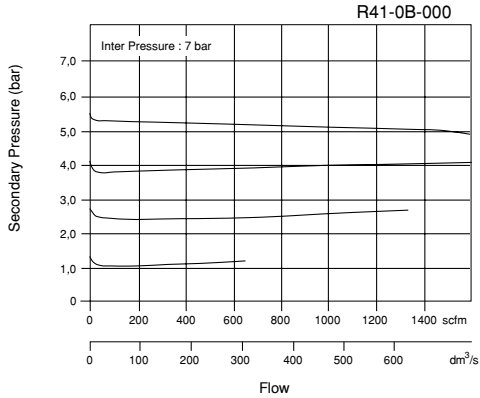
R31-08-000



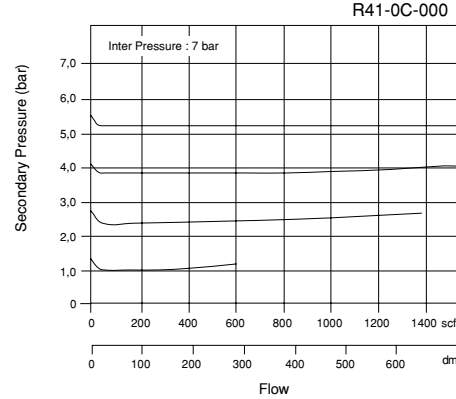
R31-0A-000



R41-0B-000



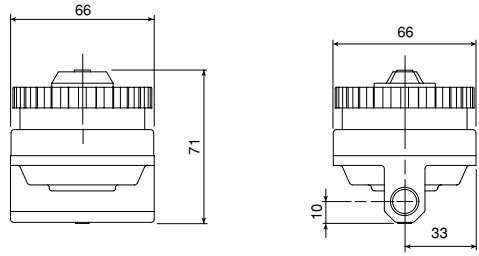
R41-0C-000



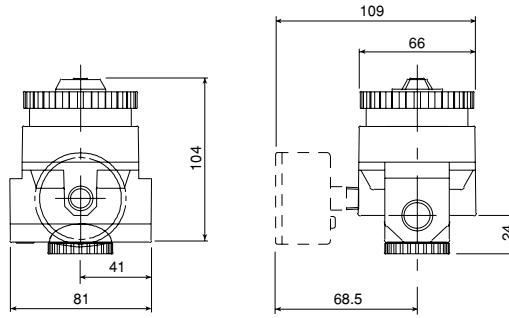
Dimension

(Unit : mm)

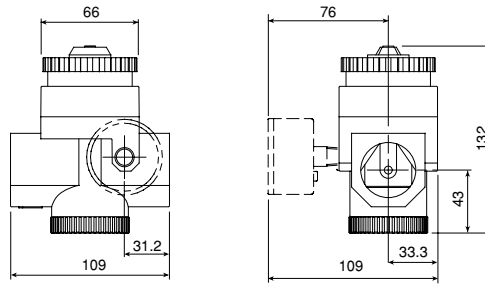
R11



R21



R31

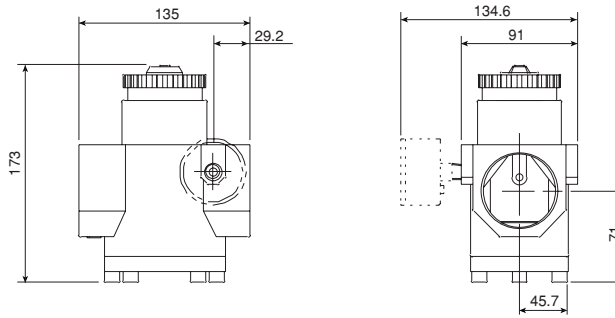


Dial Regulator

Dimension

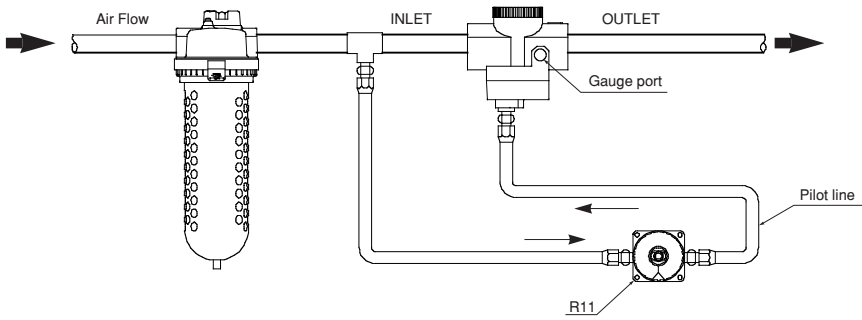
(Unit : mm)

R41



Example)

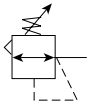
R21/31/41-XX-RXX
Principal Regulator(Remote Oerated)



Precision Regulator

27R Series

Symbol



ORDER KEY

27R 1 10 A C -

Series
Drecision Regulator

Port size

0	1/8"
1	1/4"
2	3/8"

Pressure range

10	2.1 bar
12	1.0 bar
13	8.3 bar
14	4.2 bar

Port type

None	NPT
1	BSPP
2	BSPT

Relief type

A	Non-Rising Knob/ Relief type

Specifications

	Unit	27R
Port size		1/8", 1/4", 3/8"
Gauge port size		1/8"
Max.Operating pressure	Mpa	1.7MPa
Max.Flow capacity	ℓ /min(ANR)	800 (at 6 bar)
Relief capacity	ℓ /min(ANR)	14.3
Repeatability	Mpa	±0.097
Operating temperature	℃	0~80
Weight	kg	0.45

Kits & Assessories

Gauge	0 - 4 bar	P530154
	0 - 11 bar	P77713
Mounting Braket Kit		PS963P
Pauel Mount Nut		PS964P
Service Kit		PS907P
Springs	0.07 - 2.1 bar	P04427
	0.07 - 1 bar	P04428
	0 - 4 bar	P04426
	0.14 - 8.6 bar	P04425

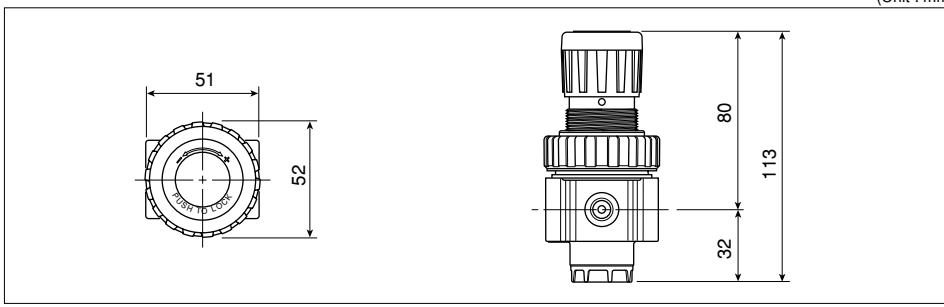
Materials

Poppet	Brass
Bonnet	Plastic
Body	Zinc
Knob	Plastic
Diaphragm	NBR
Botton Cap	Plastic
Seals	NBR
Springs	Steel

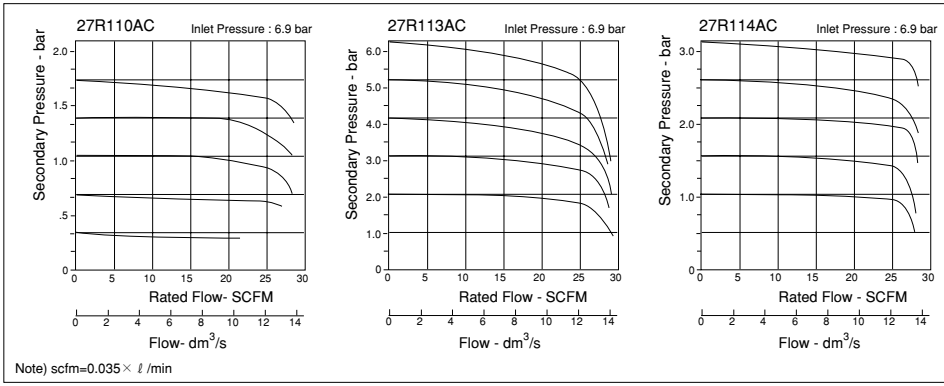
Precision Regulator

Dimension

(Unit : mm)

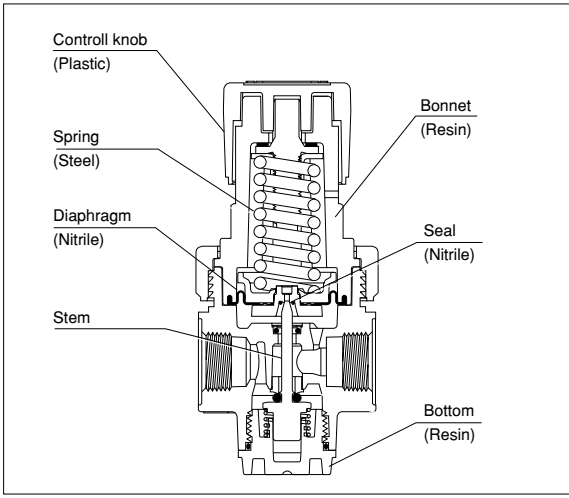


Flow Caracters



Note) scfm=0.035× ℓ /min

Dimension



Accessory

Item		Order No.
Gauge	4.1 bar	P530154
	11 bar	P77713
Mounting Bracket Nut		PS963P
Pannel Mounting Nut		PS964P

Precision Regulator

R210 Series

Symbol

ORDER KEY

R210 - 0 2 A

Series

210	Standard
220	High-Relief

Thread Type

0	NPT

Port Size

2	¼

Adjustable Pressure Range

A	0.13 ~ 2.7 bar
C	0.13 ~ 8.0 bar

Specification

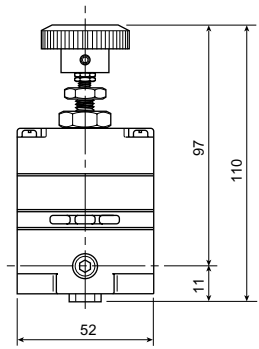
Series	Unit	R210	R220
Port Size	NPT	¼	¼
Gauge Port Size	NPTF	¼	¼
Max. Operating Pressure	bar (psig)	10.3 (150)	
Max. Flow Capacity	ℓ / min(ANR)	400 (Supply 6.9 bar, Secondary 1.4bar)	
Relif Capacity		85	315
Air Consumption		2.9 less	
Repeatability	bar (psig)	± 0.0003 (0.005)	
Operating Temperature	℃	0 ~ 65	
Weight	kg	0.64	

Precision Regulator

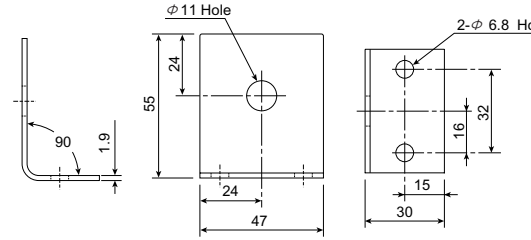
Dimension

(Unit: mm)

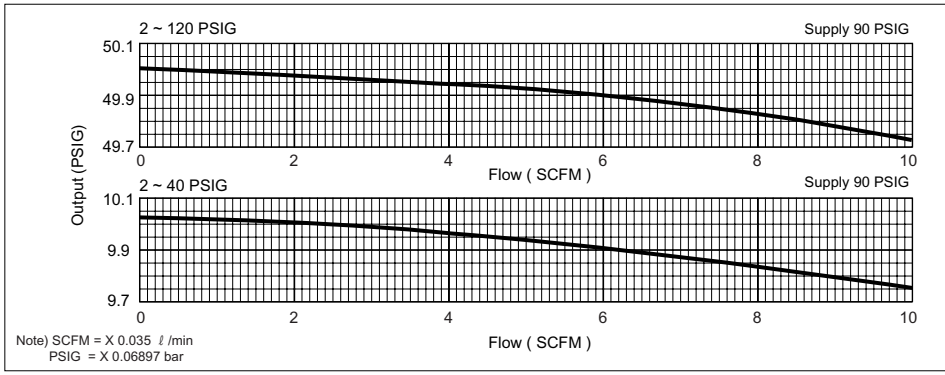
R210 / R220



Mounting Bracket

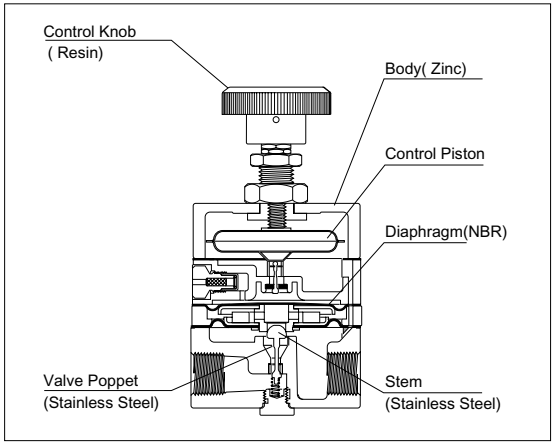


Flow Caracters



Note) SCFM = X 0.035 ℓ /min
PSIG = X 0.06897 bar

Construction



Accessory

Item	Order No.
Mounting Bracket	446-707-045

Precision Regulator

R230 Series

Symbol

ORDER KEY

R230 - 0 2 C

Series

230	Precision Regulator

Thread Type

0	NPT

Port Size

2	¼

Adjustable Pressure Range

E	0 ~ 0.13 bar
B	0 ~ 2.0 bar
C	0 ~ 4.0 bar
D	0 ~ 10.0 bar

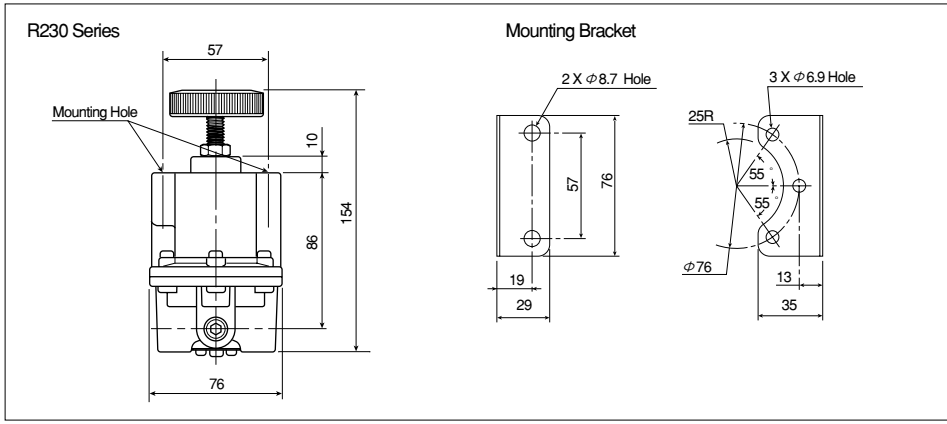
Specification

Series	Unit	R230
Port Size	NPT	¼
Gauge Port Size	NPTF	¼
Max. Operating Pressure	bar (psig)	17.0 (250)
Max. Flow Capacity	ℓ / min(ANR)	400 (Supply 6.9 bar, Secondary 1.4bar)
Relif Capacity		115
Air Consumption		0.5 ~ 6
Repeatability	bar (psig)	± 0.010 (0.00068)
Operating Temperature	℃	-5 ~ 71
	kg	0.74

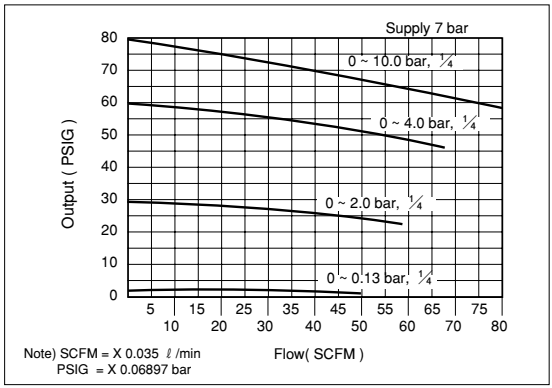
Precision Regulator

Dimension

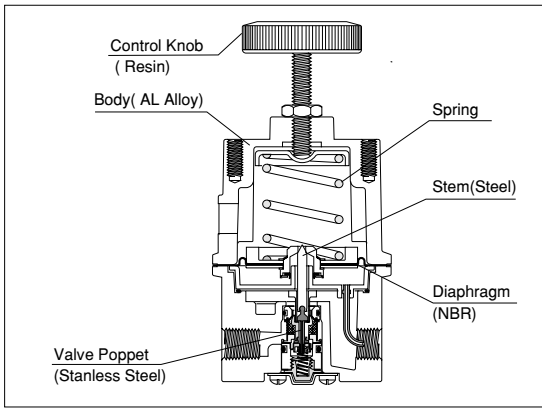
(Unit : mm)



Flow Caracters



Construction



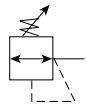
Accessory

Item	Order No.
Mounting Bracket	446-707-025

Water Service Regulator

20R Series

Symbol



ORDER KEY

20R **1** **13** **G** **C** **-**

Series
Water Service Regulator

Port Size

0	⅛
1	¼

Adjustable Pressure Range

11	2.1 bar
12	1.0 bar
13	8.6 bar
61	4.21 bar

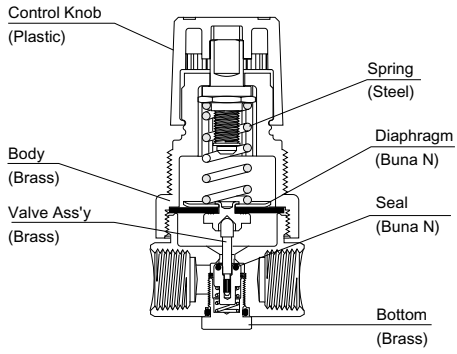
Construction

G	Non-Relif Type

Port Type

No mark	NPT
1	BSPP(G)

Construction



Accessory

Item	Order No.
Pannel Mounting Nut	PR05X51
Mounting Bracket Nut	SA161X57
Bonnet Kit	PCKR364Y
Pressure Control Locking Kit	PCKR364T

Spare Parts

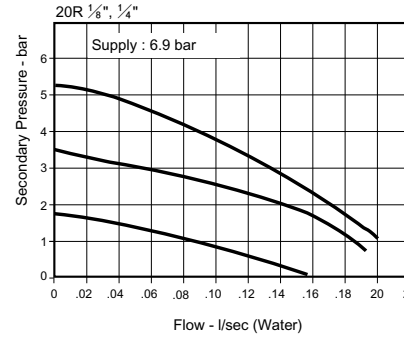
Item		Order No.
Service Kit	Relif Type	PCKR364Y
	Non-Relif Type	PCKR364T

Water Service Regulator

Specification

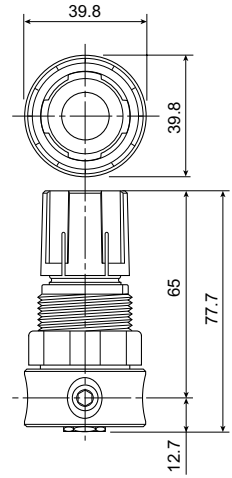
Series	Unit	20R
Port Size	NPT, BSPP(G)	⅛, ¼
Gauge Port Size	NPT, BSPP(G)	⅛
Operating Pressure Range	bar	0 ~ 20.7
Operating Temperature Range	℃	0 ~ 52
Weight	kg	0.23

Flow Chart



Dimension

(Unit : mm)



Relif Valve

P134 Series

Symbol

ORDER KEY

P134 | **0** | **2** | **AA** | **P**

Series
Relif Valve

Thread Type

0	NPT

Port Size

2	Rc ¼

Adjustable Pressure Range

AA	1.0 bar
A	1.7 bar
B	3.5 bar
C	7.0 bar

Option

P	Pannel Mounting Nut

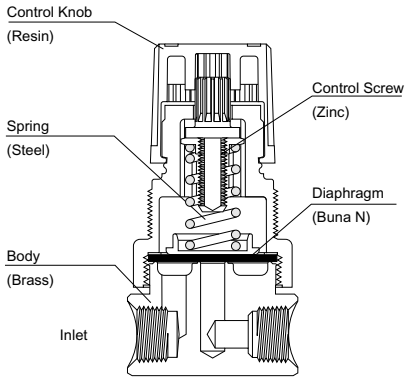
Specification

Series	Unit	P134
Port Size(Supply)		⅛" ×2, ¼" ×1
Port Size(Exhaust)		¼"×1
Operating Pressure Range	bar	20.7
Relif Pressure Range	bar	0 ~ 6.9
Operating Temperature Range	℃	4 ~ 49

Accessory

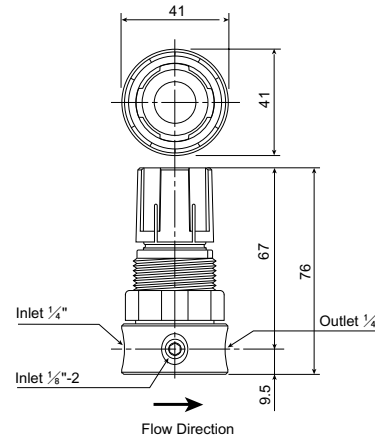
Item	Order No.
Pannel Mounting Nut	PR05X51

Construction



Dimension

(Unit : mm)



Relif Valve

P130 Series

Symbol

ORDER KEY

P130 | 0 | 2 | AA | P

Series
Relif Valve

Thread Type

0	NPT

Port Size

2	PT ¼

Adjustable Pressure Range

AA	1.0 bar
A	1.7 bar
B	3.5 bar
C	7.0 bar

Option

P	Pannel Mounting Nut

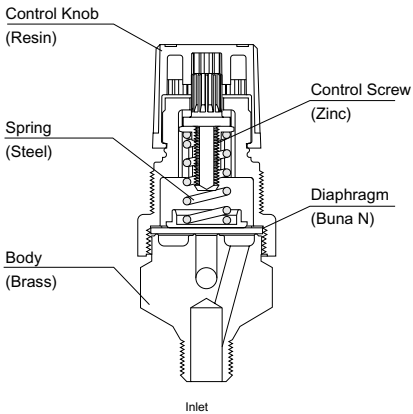
Specification

Series	Unit	P130
Port Size(Supply)		PT ¼"
Port Size(Exhaust)		Φ5.5 홀
Operating Pressure Range	bar	20.7
Relif Pressure Range	bar	0 ~ 6.9
Operating Temperature Range	℃	4 ~ 49

Accessory

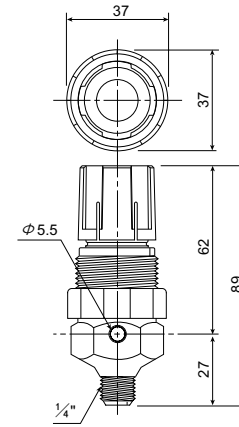
Item	Order No.
Pannel Mounting Nut	PR05X51

Construction



Dimension

(Unit : mm)



Pneumatic

Electrironic Proportional Regulator

P3HP Series

Elctironic Proportional Regulator

Moduflex proportional technology

Man-machine interface

High visibility LED display
Easy to read characters
All controls on thesame face

Energy Saving

Low Watt Power Consumption
No Unnecessary Loss of Air in Steady State

Total flexibility

User friendly and easily accessible software
One basic unit suits all customer requirements

Special applications

Food version:Clean line design
Suitable for washdown: IP65

Compact & light weight

Small envelope
Light weight (P3HP = 285 gram)

Flexible mounting options

Stand-alone
Foot bracket mounting
DIN-rail mounting

Outstanding performance

Very fast response times
Full flow exhaust
Excellent linearity

Generic Industries

The new P3HP Regulator is designed to quickly and accurately adjust and maintain a set output pressure.

The unit will operate regardless of flow, in response to an electronic control signal. The medium can be compressed air or an inert gas.

Applications for this technology are virtually unlimited; from paint spray control, paper manufacture and printing to weaving and laser cutting control; in fact anywhere that requires accurate remote pressure control.

Automation

In the field of general automation, the need to control processes or movement via electronic signals is of paramount importance. This new unit provides the facility to incorporate pressure control into a fully integrated control system.

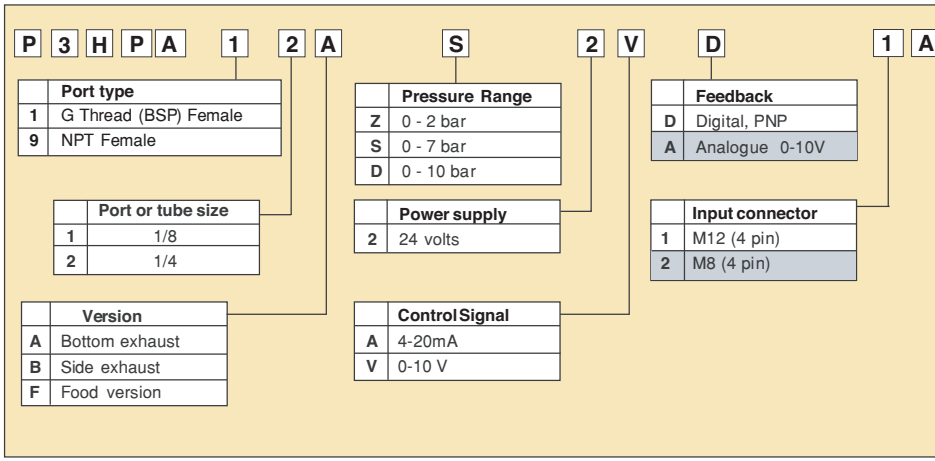
Packaging and Food

The Packaging and Food industry providesanother ideal area for application of theElectronic Proportional Regulator, where finecontrol of tension on wrapping foils and paper isrequried. The degree of control and the ability tomanually change parameters makes this unitideally suited to the varying requirements of thisindustry.

Automotive

Applications for this innovative product in theAutomotive industry can be seen in majormanufacturers ‘body-in-white’ lines.The control of clamping and welding forcesduring panel assembly is an ideal application,also accurate control in paint dipping andspraying can be achieved.

Order Key



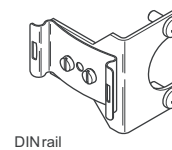
On request

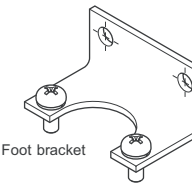
Popular Options

Port Size	Order Code	Control Signal	Output Pressure
G1/4	**P3HPA12AZ2AD1A**	4-20mA0	-2 bar
G1/4	**P3HPA12AS2AD1A**	4-20mA0	-7 bar
G1/4	**P3HPA12AD2AD1A**	4-20mA0	-1 0 bar
G1/4	**P3HPA12AZ2VD1A**	0 - 10 V0	-2 bar
G1/4	**P3HPA12AS2VD1A**	0 - 10 V0	-7 bar
G1/4	**P3HPA12AD2VD1A**	0 - 10 V0	-1 0 bar

Mounting Options

Order Code	Description
P3HKA00MK	DIN rail mounting kit
P3HKA00MF	Foot bracket mounting kit


DIN rail


Foot bracket

For dimensional information, refer to page 15.

Cable's

Order Code	Description
P8L-MC04A2A-M12	2 mtr. cable with moulded straight M12x1 connector
P8L-MC04R2A-M12	2 mtr. cable with moulded 90 degree M12x1 connector.

Technical information

Pneumatics
Working medium
Compressed air or inert gasses, filtered to min. 40 , lubricated or non-lubricated, dried or un-dried, pressure dewpoint 3-5°C.

Supply pressure
Max. Operating Pressure:
2 bar unit: ..... 3 bar (43.5 PSI)
7 bar unit: ..... 10.5 bar (152 PSI)
10 bar unit: ..... 10.5 bar (152 PSI)
Min. Operating Pressure ... P2 Pressure + 0,5 bar (7.3 PSI)

Pressure control range
Available in three pressure ranges, 0-2 bar, 0-7 bar or 0-10 bar. Other ranges on request. Pressure range can be changed through the software at all times. (parameter 19)

Temperature range
0°C up to +50°C (32°F up to122°F)

Weight:
P3HP = 285 gram

Air consumption
No consumption in stable regulated situation.

Display
The regulator is provided with a digital display, indicating the output pressure, either in BAR or PSI.
The factory setting is as indicated on the label, can be changed through to software at all times (parameter 14).

Electronics
Supply voltage
24 VDC +/- 10%

Power consumption
Max. 1.1W with unloaded signal outputs

Control signals
The electronic pressure regulator can be externally controlled through an analogue control signal of either 0-10V or 4-20mA.(parameter 4 see page 9).

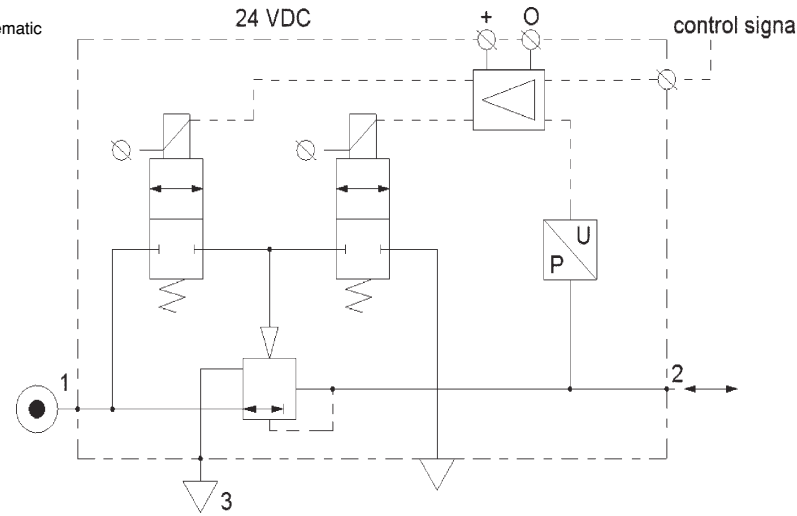
Output signals
As soon as the output pressure is within the signal band a signal is given of 24V DC, PNP Ri = 1 kOhm
Outside the signal band this connection is 0V.

Connections
Central M12 connector 4-pole

The electrical connections are as follows:

Pin no.	Function	Colour
1	24V supply	brown
20	-10V control signal Ri = 100 kOhm	white
30	0 V (GND) supply	blue
4	24V alarm output signal	black

Schematic



*F.S. = Full scale = chosen max. output pressure = 100% pressure control range.

Technical information

Dead band
The dead band is preset at 1,3% F.S.*
(parameter 13, see page 12)

Accuracy
Linearity: = < 0,3% F.S.*

Proportional band
The proportional band is preset at 10% F.S.*

Fail safe operation
After interrupting the **power supply** the present output pressure is maintained at approximately the same level. After switching on the power supply again the pressure can be adjusted immediately by giving a new control signal.

Full exhaust
Complete exhaust of the regulator is defined as P2 ≤ 1% F.S.*

Degree of protection
IP 65

EU conformity
CE: standard
EMC: according to directive 89/336/EEC
The new pressure regulator is in accordance with:

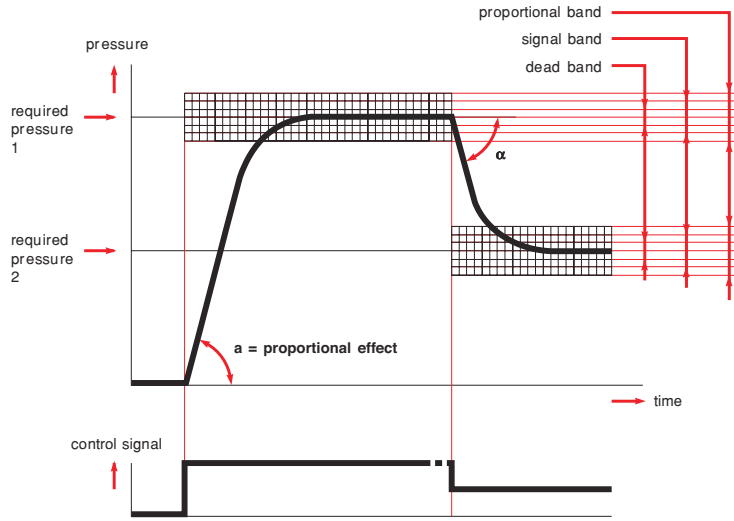
EN 61000-6-1:2001
EN 61000-6-2:2001
EN 61000-6-3:2001
EN 61000-6-4:2001

These standards ensure that this unit meets the highest level of EMC protection.

Mounting position
Preferably vertically, with the cable gland on top.

Materials
Parts in contact with the working media:
- Magnet Core ..... Steel
- Solenoid Valve Poppet ..... FPM
- Core Housing ..... Brass
- Solenoid Valve Housing ..... Techno Polymer
- Regulator Housing ..... Techno Polymer
- Valve ..... Polyurethane
- Seats and Auxiliary Piston ..... Delrin, Brass
- Remaining Seals ..... NBR
- Port Connections
  Standard Version ..... Brass
  Food ..... Stainless Steel

Regulation characteristics



*F.S. = Full scale = chosen max. output pressure = 100% pressure control range.

Advanced functionality

Pilot valve protection
When the required output pressure can not be achieved because of a lack of input pressure the unit will open fully and will display NoP. Approximately every 10 seconds the unit will retry. The output pressure will then be approximately equal to the inlet pressure. As soon as the input pressure is back on the required level, the normal control function follows.

Safety exhaust
Should the **control signal** fall below 0,1 volts the valve will automatically dump downstream system pressure .

Fail safe
When the **supply voltage** drops below 19VDC, the electronic control reverts to the fail safe mode. The last known output pressure is maintained at approximately the same level depending upon air consumption. The digital display indicates the last known pressure setting.
When the supply voltage is reinstated to the correct level, the valve moves from the fail safe mode and the output pressure immediately follows the control signal requirement. The display indicates the actual output pressure.

Input protection
The unit has built-in protection against failure and burn outresulting from incorrect input value, typically:

The 24v DC supply is incorrectly connected to the setpoint input, the display will show 'OL', as an overload indication. The unit will need to be rewired and when correctly connected will operate normally.

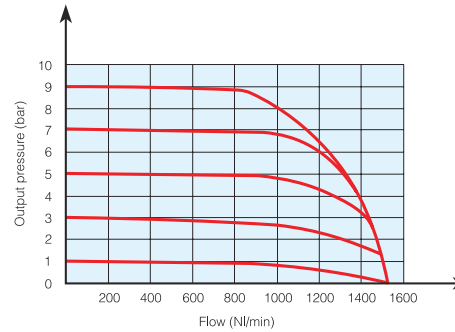
The overload indicator 'OL' will also appear should the wrong input value be applied or the wrong input value be programmed: (0 - 10v instead of 4 - 20mA or conversely 4 - 20mA rather than 0 - 10V). To correct this a different set point value should be input or the unit reprogrammed to correct the set point value acceptance. (via parameter 4).

Response times
To fill volume of 100cm , connected to the outlet of the regulator:
Pressure increase from 2 to 4 bar (30 to 60 PSI) 30 msecs
Pressure increase from 1 to 6 bar (15 to 90 PSI) 120 msecs
Pressure decrease from 4 to 2 bar (60 to 30 PSI) 60 msecs
Pressure decrease from 6 to 1 bar (90 to 15 PSI)160 msecs

Settings
The regulator is pre-set at the factory. If required, adjustments can be made.

Flow characteristics

Flow characteristics (supply pressure 10 bar (150 PSI))



How to change parameters

Pressing the Accept key "acc" for more than 3 seconds, will activate parameter change mode. The user can then select the parameters by pressing up or down key. (display will show Pxx). When parameter number is correct, pressing accept again will enter parameter number.(display will show parameter value).

Pressing the up or down key will change the parameter itself. (display will flash indicating parameter editing mode). Pressing the accept key will accept the new parameter value. (all digits will flash whilst being accepted).

After releasing all keys , the next parameter number will be presented on the display. (you may step to the next parameter). When no key is pressed, after 3 seconds the display will show the actual output pressure.

Only parameter numbers 0, 4, 9, 14, 18, 19, 20, 12, 13 and 21 are accessible to edit. All other parameters are fixed.

Manual mode

When keys DOWN and UP are pressed during startup, (connecting to the 24V power supply) manual mode is activated. This means that the user is able to in/decrease the output pressure of the P3HP, by pressing the UP or DOWN key. During this action the display will blink, indicating that the manual mode is activated.

Back to Factory Setting

After start up. (Power is on)
Entering this value in parameter 0 will store the calibrated factory data into the working parameters.
(Default calibration data is used)

Parameter Number 0 – Reset Back to Factory Settings

Step	12345					
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P00	000. Flashing DecimalF	003. lashing Decimal	003 Flashing	P01
Description	Accesse su changeable parameters	Accesses parameter no. 0	Displays current parameter value.	Edits parameter. 3 = standard factory settings. If other than 3, Use Up or Downs Arrow and accept 3	Accepts and saves new parameter setting.	Sequences to next parameter.

Set Control Signal

The unit is factory set for 0-10 V control signal. If 4-20 mA control signal is required, change parameter 4.

Parameter Number 4 – Set Control Signal in Volts or Milliamps

Step	12345					
Press	acc 3-6 seconds	▼ or ▲	acc	▼	acc	
Until Display Reads	Pxx	P04	001. Flashing DecimalF	000. lashing Decimal	000 Flashing	P05
Description	Accesse sv changeable parameters	Accesses parameter no. 4	Displays current parameter value. 1 = V 0 = mA	Edits parameter	Accepts and saves new parameter setting.	Sequences to next parameter.

Adjust Digital Display

If necessary, adjustments can be made to the digital display when using an external pressure sensor.

Parameter Number 9 –Adjust Digital Display Value (Pressure Calibration)

Step	12345					
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P09	### Flashing DecimalF	### lashing Decimal	### Flashing	P 10
Description	Accesse sv changeable parameters	Accesses parameter no. 9	Displays current digital display.p	Use up or down arrows and accept to adjust the display Value if using an external ressure sensor	Accepts and saves new parameter setting.	Sequences to next parameter.

Set Pressure Scale

Units with NPT port threads are supplied with a factory set PSI pressure scale. Use parameter 14 to change scale to bar.

Parameter Number 14 – Set Pressure Scale in PSI or bar

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P 14	001.	000.	000	P 15
			Flashing Decimal	Flashing Decimal	Flashing	
Description	Accesses changeable parameters	Accesses parameter no. 14	Displays current parameter value. 1 = PSI 10 = bar	Edits parameter	Accepts and saves new parameter setting.	Sequences to next parameter.

Preset Minimum Pressure

If there is a need for a pre-set minimum pressure, use parameter 18. (Note: preset pressure is affected by % P19.)

Parameter Number 18 – Set Minimum Preset Pressure

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P 18	000.	###.	###	P 19
			Flashing Decimal	Flashing Decimal (value between 0 and 200)	Flashing	
Description	Accesse ss changeable parameters	Accesses parameter no. 18	Displays current parameter value. Incremental value is: 2 bar unit: x 2 mbar x % P19 10 bar unit: x 10 mbar x % P19	Edits parameter	Accepts and saves new parameter setting.	Sequences to next parameter.

Set Pressure Correction

Parameter Number 19 – Set Maximum Preset Pressure

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P 19	100.	###.	###	P20
			Flashing Decimal	Flashing Decimal (value between 0 and 100)	Flashing	
Description	Accesses changeable parameters	Accesses parameter no. 19	Displays current parameter value. Incremental value is %of F.S.	Edits parameter	Accepts and saves new parameter setting.	Sequences to next parameter.

Behavior Control

The regulation speed of the pressure regulator can be modified by means of one parameter. (P 20)
The value in this parameter has a range from 0-5. A higher value indicates slower regulation speed, but will be more stable.

Parameter Number 20 – Set Behavior Control

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P20	003. Flashing Decimal	###. Flashing Decimal (value between 0 and 5)	### Flashing	P21
Description	Accesses changeable parameters	Accesses parameter no. 20	Displays current parameter value.	Edits parameter 0 = custom set* 1 = fastest (narrow proportional band) 2 = fast 3 = normal 4 = slow 5 = slowest (proportional band is broad)	Accepts and saves new parameter setting.	Sequences to next parameter.

*When the value 0 is entered, you are able to create your own custom settings true parameters 12, 13 and 21.

Fine Settings

Set Proportional Band

Proportional band is used for setting the reaction sensitivity of the regulator. The displayed value is X 10 mbar and has a range between 50 (0.5 bar) and 250 (2.5 bar).

Parameter Number 12 – Set Proportional Band (P20 Must be Set to 0)

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P12	100. Flashing DecimalF	###. lashing Decimal (value between 50 and 250)	### Flashing	P13
Description	Accesses changeable parameters	Accesse parameter no. 12	Displays current parameter value. Incremental value is X 10 mbar.	Editsparameter	Accepts and saves new parameter setting.	Sequences to next parameter.

Set Deadband

Deadband is the minimum limit of accuracy at which the regulator is set for normal operation.
The displayed value is X 10 mbar and has a range between 2 (20 mbar) and 40 (400 mbar).

Parameter Number 13 – Set Deadband (P20 Must be Set to 0)

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P 13	0 15.	### . lashing Decimal (value between 2 and 40)	### Flashing	P 14
			Flashing Decimal			
Description	Accesses changeable parameters	Accesses parameter no. 13	Displays current parameter value. Incremental value is X 10 mbar.	Edits parameter	Accepts and saves new parameter setting.	Sequences to next parameter.

Proportional Effect

Sets the speed at which the regulator adjusts either filling or exhausting. The displayed value has a range between 5 (faste stregulation) and 100 (slowest regulation).

Parameter Number 21 – Set Proportional Effect (P20 Must be Set to 0)

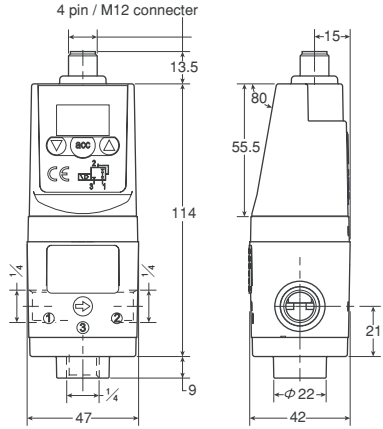
Step	1	2	3	4	5	
Press	acc 3-6 seconds	▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P21	0 10.	### . Flashing Decimal (value between 5 and 100)	### Flashing	P22
			Flashing Decimal			
Description	Accesses changeable parameters	Accesses parameter no. 21	Displays current parameter value.	Edits parameter 5 = fastest regulation 100 = slowest regulation	Accepts and saves new parameter setting.	Sequences to next parameter.

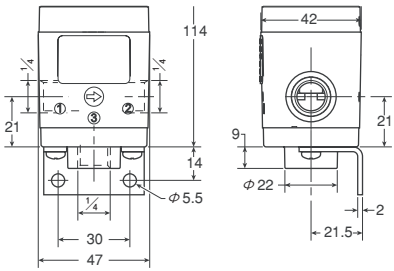
Parameter Number 39 – Displays Current Software Version

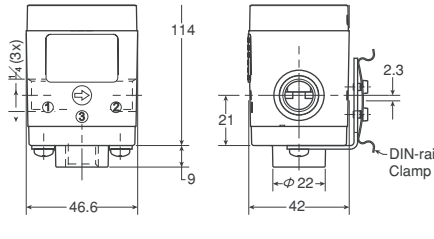
Step	1	2	3	
Press	acc 3-6 seconds	▲	acc	
Until Display Reads	Pxx	P39	### . Flashing Decimal	
Description	Accesses parameters	Accesses parameter no. 39	Displays current parameter value. XXX = current software version	

Dimensional drawings

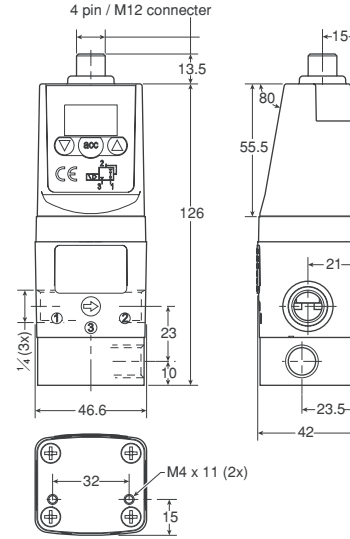
Bottom exhaust version

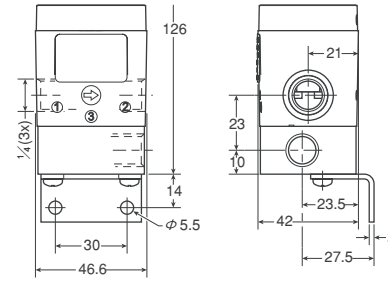


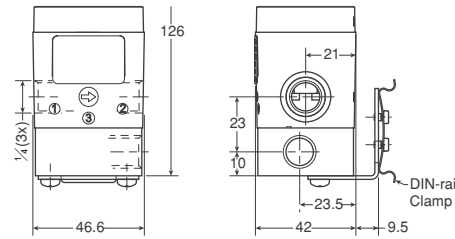




Side exhaust version







Parker
Pneumatic

Proportional Valve & Regulator

EPV/ER Series

Electronic Regulator / Proportinal Valve

EPV / ER Series

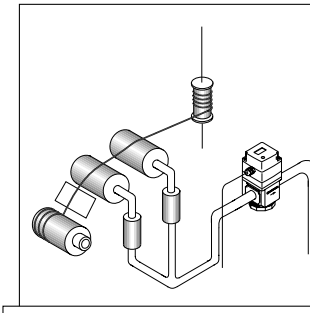
- Wilkerson elecrronic regulators provide internal 5-micron filtration to the controller and flows in excess of 94.3dm^3/s (200 /SCFM) without requiring volume-booster options. For the size, the ER1 and ER2 are among the smallest, highest perfoming electro-pneumatic units on the market today,and among the least expensive.

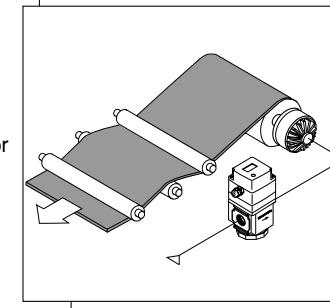
- The ER1 and ER2 are available in a variety of size, from 1/4" to 3/4" ports, in both NPT and G-series threads. in addition, the ER1 and ER2 utilize the same convenient modular connection method as Wilkerson's innovative 18/28 FRL system.

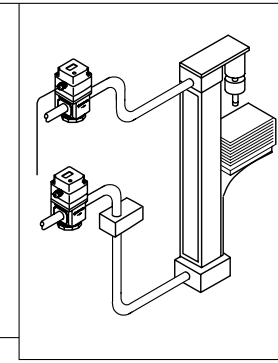
- The **NEW**EPV provides highly accurate pressure for static and low flow applications. In addition, the **NEW**EPV are available in both 1/8"NPT or G-series outlet ports on three sides and has a unique compact design which allows for easy installation.

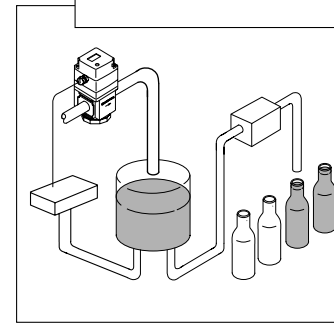
TYPICAL APPLICATIONS

- Tip Pressure control for resis tance welding
- Cylinder force control
- Force control for Electronic component assembly operations
- Force control for grinding applications
- Control of feed rollers on sheet feed devices
- Flow control for diaphragm pumps
- Liquid flow control for pharmaceutical of food product dispensing
- Air pressure control for hlue flow in lamination processes
- Flow control for mixing precise product formulations
- Control of air and fluid in spray painting processes
- Control of system pressures for conveying dry materials
- Regulation of theckness in plastic film manufacturing
- Control of various processes in the production of rubber and rubber tires
- Control of ride level in semi-truck trailers
- Control of bottled gas flow through a fixed orifice
- Control of pressure required for leak testing containers
- Accurate edge guiding in web systems
- Web tension control systems
- Tension control for thread settings in textile manufacturing
- Control of air pressure to simulate altitude and water depth for testing applications
- Control of rodless cylinders to operate robotic arms in case loadeng operations
- Pressure control for plastic blow-molding operations



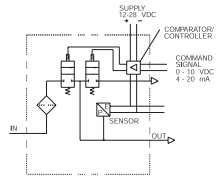






Electronic Proportional Valve
EPV Series

Symbol



ORDER KEY

EPV – **0** **1** – **0** **A** **D** **0**

Series

EPV	Electronic proportional valve

Thread Type

T	Rc(PT)
O	NPT
C	BSPP[1]

Port Size

1	1/8"

Range

H	0~6.0 bar
D	0~4.0 bar
C	0~2.0 bar
A	0~1.0 bar

Input

O	0~10V DC
A	4~20 mA
B	Internal Resistor

LED

O	None
P	PSIG DISPLAY
B	BAR DISPLAY

1. ISO, R228 (G Series)

Specifications

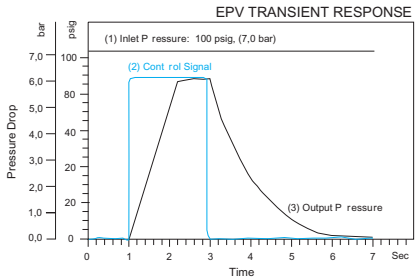
Model No	Unit	EPV
Port Size		1/8"
Flow Rate	Cv	0.02
Fluid		Air
Overall Accuracy		0.8% Scale
Linearity	Mpa(bar)	<0.006(0.06)
Response	ms	50
Step Response 2	ms	with step input 600
Output Pressure Ranges	Mpa(bar)	0.1(1),0.2(2),0.4(4),0.6(6)
Maximum Supply Pressure	Mpa(bar)	1.02(10.2)
Maximum Operating Temperature	℃	50
Weight	kg	0.42

Note) 1. Response time for the unit to recognize and correct for a change in set value or conditions.
2. Step response is the time to go from 10~90% of set value with a 60 psig(4, 0 bar) step input.

Main Parts

Body/Cap	Aluminum
Body Cover	ABS
Valve Ass'y	Brass/Nitrile
Seals	Nitrilp

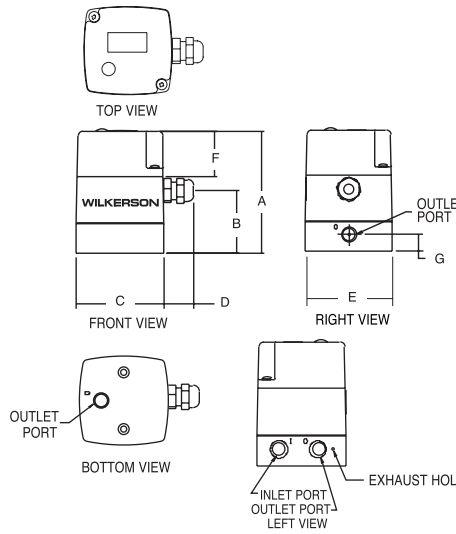
Flow Characters



Electronic Proportional Valve

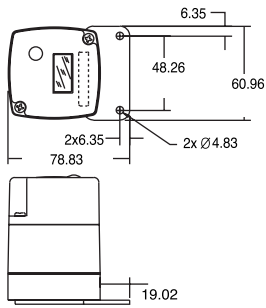
Dimensions

(Unit : mm)

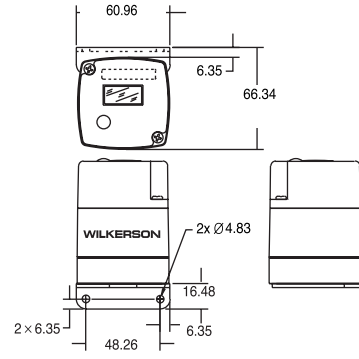


	A	B	C	D	E	F	G
EPV	83	43	60	20	60	30	11

Flat Bracket



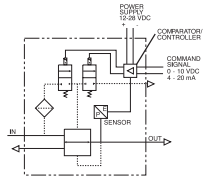
Angled Bracket



Electronic Ragulator

ER1, ER2 Series

Symbol



ORDER KEY

ER 1 – 0 3 – 0 A 0 0

Series

ER	Electonic Regulator

Body Size

1	1/4",3/8",1/2"
2	3/8",1/2",3/4"

Therad Type

T	Rc(PT)
O	NPT
C	BSPP[1]

Pressure Ranges

O	0~8.5 bar
H	0~6.0 bar
D	0~4.0 bar
C	0~2.0 bar

Input Sigral

O	0~10V DC
A	4~20 mA
B	Internal Resistance

LCD Option

O	None
P	PSIG
B	BAR

Port Size

2	1/4"[2]
3	3/8"
4	1/2"
6	3/4"[3]

1. ISO, R228 (G Series)
2. Availa ble on ERI only
3. Available on ER2 only

Electronic Ragulator

Specifications

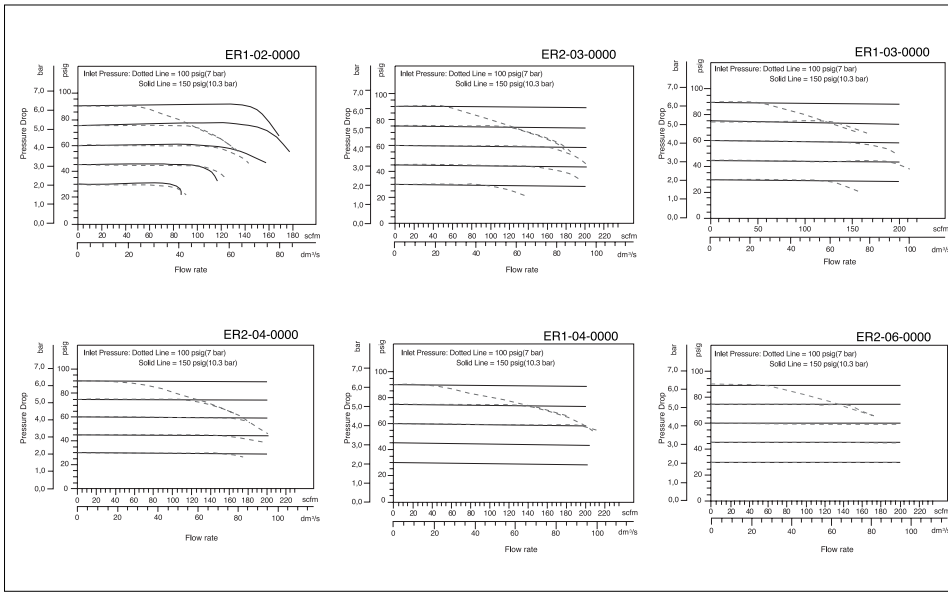
Model No		Unit	ER1	ER2
Flow Capacity	1/4	l/min (ANR)	4,714	
	3/8		5,714	5,714
	1/2		5,714	5,714
	3/4		-	5,714
Fluid			Air	
Sensitivity			±0.8% of full scale	
Hysteresis/Repeatability			±0.8% of full scale	
Lineority		Mpa(bar)	0.06 (0.6)	
Response		ms	With step input 600	
Maximum Supply Pressure		Mpa(bar)	1.02(10.2)	
Adjusting Renge		Mpa(bar)	0~0.85 (0~8.5)	
Maximum Operating Temperature		℃	50	
Weight		kg	0.8	1.1

Note) Inlet pressure 10.3 bar. Secondary pressure 6.2 bar

Main Parts

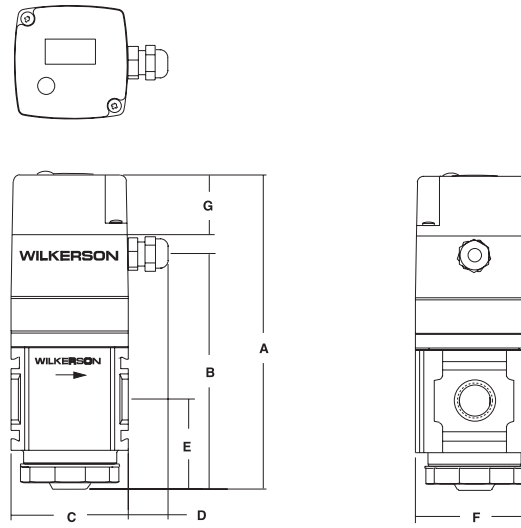
Body	Aluminum
Diaphragm plate	Acetel
Body Cover	ABS
Diaphragms	Nutrile/Zinc/Brass
Valve Ass'y	Brass/Nitrile
Springs	Music Wire/Stainless Steel
Seals	Nitrile
Panel Nut	Acetal
Bottom Plug	33% glass-filled-Nylon 6-12

Flow Characteristic



Dimensions

(Unit : mm)



	A	B	C	D	E	F	G
ER1	160	120	60	20	45	60	30
ER2	160	120	73	20	45	73	30

Parker
Pneumatic

Membrane Dryer
MSD Series

MSD membrane dryer functions

To achieve optimum performance and high quality compressed air for your application, it is imperative to install a Parker Microaleser™ filter with automatic drain. The coalescing-filter prevents dirt particles and oil and water aerosols from contaminating the membrane. This drawing illustrates a typical clean, dry air system.

How It Works :

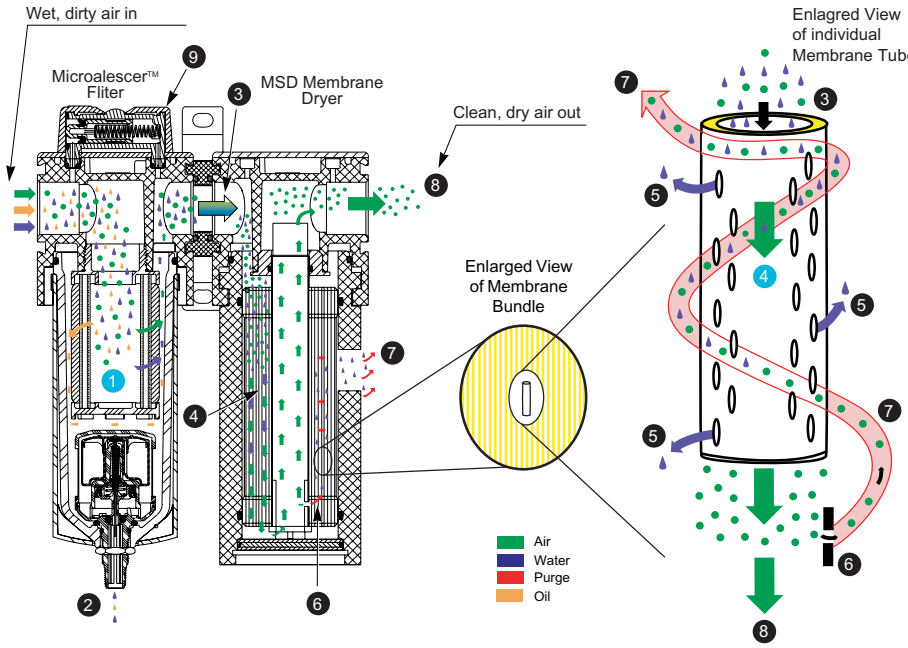
Dirty saturated air enters the Parker coalescing micro-filter ① where solid particles, liquids and aerosol contaminants are efficiently trapped. The coalesced oil and water is then discharged through the float-type outomatic drain. ②

The clean, saturated compressed air now enters the dryer ③ and goes into the module ④ that consists of a densely packed bundle of hollow fiber membranes. As the compressed air flows through the membranes, the water vapor diffuses through the walls of the membrane. ⑤ A Portion of the dried air from the outlet of the cartridge ⑥ is diverted and expanded to atmospheric pressure for use as purge air.

The counter flow purge air then sweeps over the outer surface of the hollow membrane fibers, removing the water molecules, where they are vented to atmosphere ⑦. Clean, dry air is now supplied to the application. ⑧

The principle of membrane dryer operation is very elementary. saturated air has a higher partial vapor pressure than dry air. As a result, there is a constant migration of water molecules through the membrane ⑤ walls from inside the hollow fiber membrane, where you have wet compressed air, to outside, into the lower partial vapor pressure of the purge air stream.

The MSD membrane air dryer is designed to operate continuously-24 hours per day, 7 days per week. The only maintenance required is changing filter element when the standard pressure differential indicator ⑨ shows red. Due to our innovative quick disconnect bowl design, element change out is less than five minutes.



MSD Series

ORDER KEY

MSD - 0 3 - K A 1 E

Refer to Table 1 for Dew Point and Flow Capacity Selection. Last three positions of Model numbers are determined by selection of dryer in table 1

Series

Membrane Super Dryer

Therad Type

0	NPT
C	BSPP-G

Port Size

3	3/8"
4	1/2"

Options

K	No Prefilter
C	with Prefilter Plastic Bowl/ Bowl guard Auto Drain

Table - 1

Model No	Atmospheric Dew Point ℃	Outlet Air Flow ℓ /min	Purge Flow ℓ /min	Inlet Flow ℓ /min
MSD-03-KA1E	-20	50	8	58
MSD-03-KA2E	-20	100	14	114
MSD-03-KB1E	-20	200	30	230
MSD-03-KB2E	-20	300	44	344
MSD-03-KA1D	-20	100	25	125
MSD-03-KA2D	-20	200	50	250
MSD-03-KB1D	-20	400	100	500
MSD-03-KB2D	-20	600	150	750
MSD-03-KA1D	-40	40	25	65
MSD-03-KA2D	-40	80	50	130
MSD-03-KB1D	-40	160	100	260
MSD-03-KB2D	-40	240	150	390

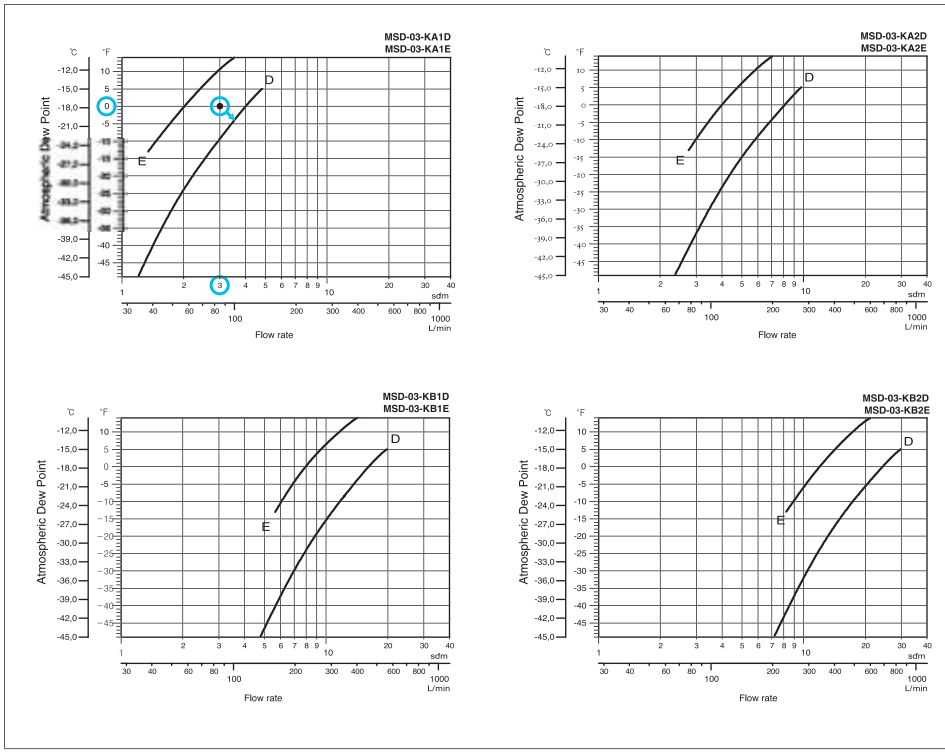
Membrane Dryers

Specifications

		Unit	MSD-03-K ***
Fluid			0.01μ Air
Maximum operation Temperature		℃	5~51
Minimum Supply Pressure		MPa(bar)	0.41(4.1)
Maxiumum Supply, Pressure			1.03(10.3)
Port Size		NPT/BSPP-G	3/8, 1/2
Max Pressure Drop	K A 1 E	MPa(bar)	0.0099(0.099)
	K A 2 E		0.0099(0.099)
	K B 1 E		0.0269(0.269)
	K B 2 E		0.0299(0.299)
weight	K A 1 E	kg	1.4
	K A 2 E		1.6
	K B 1 E		1.9
	K B 2 E		2.4

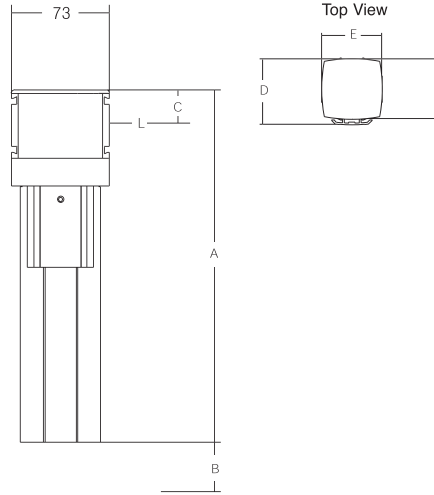
Note) Inlet pressure 6.9 bar, inlet air temperature 25℃

Flow Characters



Dimensions

(Unit : mm)



	A	B	C	D	E	F
KA1	193	42	26	-	74	74
KA2	264	42	26	-	74	74
KB1	302	57	26	79	74	74
KB2	373	57	26	79	74	74