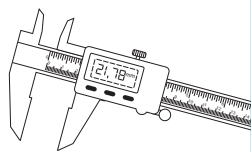




## Technical data



from page 3.1.1

## Size 1/4"



from page 3.2.1

## Size 3/8"



from page 3.2.10

## Size 1/2"



from page 3.2.20

## Size 1"



from page 3.2.30

## Modular soft-start valve



from page 3.3.1

## Accessories, assembling kits and spare parts



from page 3.5.1

## Microregulators 1/8", 1/4"



from page 3.10.1

## Analog Pressure-gauges and vacuum-gauges



from page 3.50.1

## Digital Pressure-gauges and vacuum-gauges



from page 3.60.1

## Digital Pressure Switch



from page 3.70.1

## TREATMENT OF THE COMPRESSED AIR

The air destined for use in pneumatic devices must be suitably prepared.

It is taken from the surrounding environment for introduction into the compressor and is rich in impurities and water vapour.

The compressor itself inevitably releases lubricating oil into the air, which is very dangerous for the seals of the pneumatic components.

Following passage through the compressor, the compressed air is always stored in a large tank that has a dual function: to even out oscillations in pressure and to cool the compressed air.

Indeed, the high temperatures reached at the end of the compression process aid the evaporation of the water in the air against the condensing effect of the high pressures.

For these reasons, the tank located downstream of the compressor must be of a suitable size: in particular, in the case in which the compressor is volumetric and a high quantity of air is taken up.

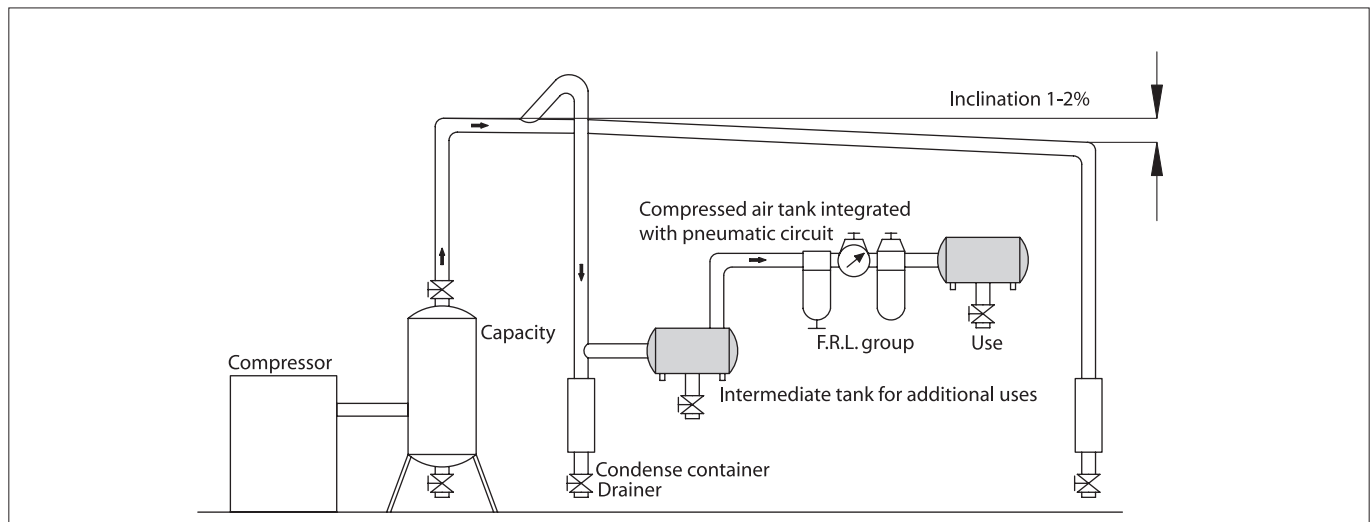
It is very important that the compressed air has time to cool, allowing the water vapour contained in it to condense on the bottom of the tank, as it is considerably more convenient to eliminate as much of the water vapour as possible during this stage.

Even with these precautions, the percentage of humidity present in the compressed air remains important. Indeed, during distribution along the pipes, further condensation occurs, due to the further cooling of the air and despite the falls in pressure that aid the dissolution of the water.

For this reason the distribution pipes must be slightly inclined (~2%) and feature umbrella-handle pipes at regular intervals that lead to small condensation collection tanks.

Particular attention must be paid to the lubricating oil, especially in the case of centrifugal compressors: it must be eliminated by means of appropriate oil extraction filters at the exit of the compressor.

The humidity of the air causes rust and corrosion in the metal pipes, deposits in the pneumatic devices and the formation of sleeves of ice at the discharge points in particular atmospheric conditions and for high-frequency use.



The operating safety and lifespan of the pneumatic devices depend to a considerable degree upon the proper preparation of the compressed air that feeds them, which is obtained by means of a series of devices that are located upstream of the part of the apparatus described so far, but before the actual pneumatic system.

The **DEVICES FOR THE TREATMENT OF THE COMPRESSED AIR** are basically constituted by: **FILTERS, PRESSURE REGULATORS, LUBRICATORS**; and by extension, their components: **MANOMETERS, PROGRESSIVE STARTING VALVES, INSERTION AND SECTIONING VALVES AND TANKS**.

## FILTERS

The impurities contained in the air: waste materials, powder, rust and humidity that condenses, can cause serious damage to the pneumatic components, compromising their functioning and duration, as they facilitate the wear of the flowing surfaces and the seals.

The **FILTERS** have the important function of purifying the compressed air of solid particles and, as a collateral effect associated with their operating characteristics, also of a percentage of the liquid ones.

The filters are constituted by: a body with threaded ports, a transparent cup screwed onto it and a filtering cartridge. The compressed air to be filtered is conveyed in a tangential direction from the supply mouth to the cup, where it assumes a cyclonic movement which enables the separation of the larger solid particles and a good part of the liquid particles; both collect on the bottom of the cup, from where they are discharged on a regular basis.

The finer solid particles, on the other hand, are captured by the filtering cartridge, which is made from sintered material (bronze, ceramic material & ).

Depending on its characteristics, the filtering cartridge captures solid particles of an average diameter of 40, 20 or 5 micron.

It is not possible **in any case** to restrain the liquid particles that do not collect on the bottom of the cup as they are drawn and pass the barrier.

Consequently the effect of separation of the condensation, which is introduced by the filter, is a secondary one; it is necessary to take care to discharge the condensation that is produced otherwise a dynamic equilibrium is produced in which as much condensation is removed as is produced.

The filters are normally equipped with a separator, beneath the cartridge, whose task is to keep the slimy liquid deposited still; levels above the separator must be discharged.

It is always advisable to choose a larger size filter in order to have the benefits of a large cup, considerable cooling of the air and good separation of the impurities.

It is NOT in any case possible to hold back sufficient liquid particles to achieve the effective extraction of oil from the air: it is just a matter of time before the oil, which is not filtered upstream, reaches the pneumatic components. A considerable percentage of humidity will also always be present in the air downstream of the filter. In order to eliminate the oil of the air compressor, it is necessary to adopt special oil extraction filters.

The choice of the cartridge depends on the degree of cleanliness necessary for the air to be used in the system.

The more complex the system, with small and fast-moving components, the greater must be the degree of filtration of the cartridge.

The ideal filter is a component that does not introduce falls in pressure. Actually, a fall of pressure always exists around a filter and depends largely on the degree of filtration.

It is advisable to limit the fall of pressure to  $0.2 \div 0.3$  bar, as the production costs of compressed air are very high and, if it is wished to maintain the supply pressure of the components constant, each fall in pressure translates into greater pressure to be generated by the compressor.

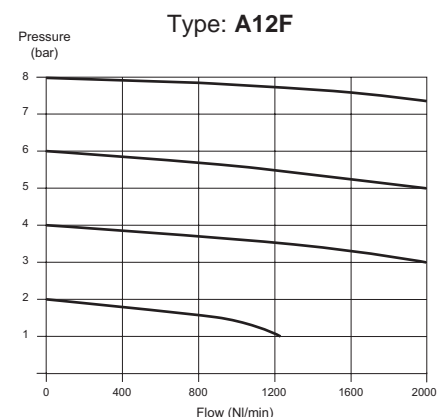
The filtering cartridge gets dirty very easily: if cleaning is neglected the flow of air across the filter can be greatly reduced; furthermore, in order to minimize falls in pressure, it is wise to clean it frequently, removing the grease from it and drying it.

## CHOOSING THE SIZE OF THE FILTERS

It is necessary to adapt the filters to the flow required by the system, or section of the system, which they feed.

The characteristic "**FALL IN PRESSURE - FLOW**" curves of the filter are used for this purpose. They associate the variation in the falls in pressure around the filter with the variation of the flow and indicate the range of use (useful flow interval) of the component in an immediately comprehensible manner.

The range of use increases with the increase in the dimensions of the filter (of its ports).



It is advisable to choose a filter of such dimensions that, at the requested flow, the fall in pressure is maintained within the limits indicated above. In this case the filter also works well for the separation of the condensation.

An under-sized filter causes excessive falls in pressure, whilst the filtering effect is poor.

Normally a filter capable of providing the required flow, without high filtering capacities, but suitable for the supply of compressed air to the valves and pneumatic cylinders, is installed at the beginning of a system. Filters that provide better quality air are installed downstream of the derived devices - with a lower flow - that require it.

## PRESSURE REGULATORS

Pressure adjustment is always necessary upstream of a pneumatic device: it prevents falls of pressure in the network from distorting the conditions of use.

The performance of valves and pneumatic cylinders are highly dependant on the value of the supply pressure. Some components require precise and constant pressures in order to work properly.

A pressure regulator is always installed upstream of the system, and its task is to maintain the operating pressure at the output opening constant with the variation of the flow and the constant pressure in the tank.

Rapid and considerable variations in flow, corresponding to consumption peaks, tend to cause falls in pressure that can be controlled by the use of suitably sized reserve tanks.

The reduced operating pressure is less than the output pressure of the compressor; both must be appropriately controlled. Indeed, whilst it is true that lower material costs and, at an equivalent power, lower flows of used air would be incurred by making the pneumatic components function at high pressure, it is equally true that the production costs of compressed air are very high and increase considerably with the increase in the value of the pressure at which the air is supplied.

If the thermodynamic efficiency of the compressor - which is notoriously bad and decreases with the increase in the final pressure - is multiplied by the bad conversion efficiency of mechanical energy into pressure energy, a very low final efficiency figure is obtained that justifies the high production costs of compressed air.

In addition, it is necessary to consider the fact that it is, in practice, impossible to eliminate the losses of compressed air, which increase proportionately with the pressure.

On average, a system can lose up to 20% of its compressed air through bad connections in correspondence with fittings and plugs.

In the presence of two cost causes, one increasing and the other decreasing in relation to the pressure, it is possible to identify a pressure value that corresponds to the minimum cost.

The optimum **operating** pressure has long been established as **6 bar**. The pressure in the tank must be that much higher in order to guarantee its cooling and energy flywheel functions.

Pressure regulators are basically constituted by:

- a body, divided into a bell (with hand-wheel for adjustments and spring) and an actual valve body (with obturator disc) equipped with threaded openings.
- a membrane between the two parts.

The air that arrives from the supply port is blocked (or allowed to pass) by an obturator disc which is opened and closed by means of a small rod controlled by the membrane in equilibrium between the two forces: one, above, (caused by a charged spring or a pressure) that is preset; the other, below, caused by the reduced pressure in the pipe downstream of the regulator.

Each variation in flow causes a temporary variation of the reduced pressure and thus an imbalance in these two forces that causes the movement of the membrane with the consequent opening or closure of the disc.

A reduction in flow causes the following temporary effects: an increase in the reduced pressure with the closure of the disc; an increase in the pressure fall, due to the reduction of the passage space and a decrease in the reduced pressure, with oscillations around the point of equilibrium, until it returns the previous value, which is the only one capable of balancing the preset force.

An increase in flow causes: a decrease in the reduced pressure; the opening of the disc; a decrease in the pressure fall, due to the increased passage space and an increase in the reduced pressure until it returns to the previous value.

In both cases the pressure regulator restores the conditions of equilibrium with a new position of the obturator disc, which is suited to the changed flow demand.

In the case of constant supply pressure and highly variable flows, the pressure regulators are **self-adjusting**; i.e. they maintain the reduced pressure basically constant.

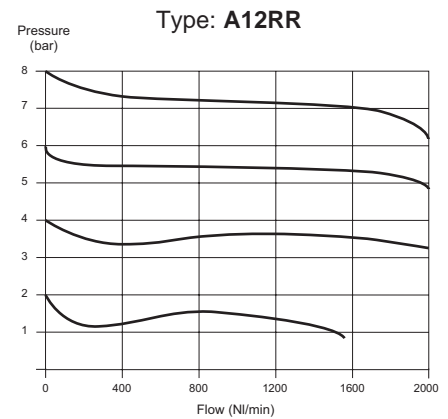
The greater the dimensions of the membrane, the greater the sensitivity of the reducer and its ability to maintain the reduced pressure constant.



## CHOOSING THE SIZE OF THE PRESSURE REGULATORS

The characteristic “**FALL IN REDUCED PRESSURE - FLOW**” curves are used for this purpose as they provide the range of use of the component in an immediately comprehensible manner.

It is always advisable to choose a regulator capable of supplying the flow of air required by the system, upstream of which it is installed, with as low a possible fall in reduced pressure: max. 0.5 bar.



The range of use of the regulator is associated with the dimensions of the ports used (standardized) and thus to the dimensions of the regulator. In order to achieve sensitivity, speed of response and small falls, it is necessary to choose large bodies with large membranes.

Two basic types of regulators can be identified:

- precision regulators, with large membranes
- commercial regulators, where the aesthetic aspect is important.

In order to achieve the most precise and easiest setting of the pressure, various **ranges of reduced pressure** are supplied for each type of regulator, by equipping them with pre-charging springs with different elastic constants.

Another significant construction characteristic for the choice of a regulator is the presence of a device that enables excess pressure in relation to the preset reduced value to be discharged into the atmosphere; in the absence of flow, this is achieved by simply varying the charge of the spring.

This process, known as **relieving**, consists in equipping the membrane with a hole with a seal upon which the controlled rod rests. As the disc reaches the end of its stroke against the closure opening, each further increase in pressure raises the membrane above the rod, releasing the air from a hole in the bell until equilibrium is restored.

## LUBRICATORS

The pneumatic devices are equipped with mechanical organs with relative movement and consequently require lubrication, which is also important in order to limit wear of the seals.

Valves and pneumatic cylinders are currently supplied with **assembly lubrication**, which is capable of ensuring them a long life **in normal working conditions**.

Lubrication is necessary in the case of pneumatic tools and particular working conditions (e.g. components that operate at high speeds or in the presence of high temperatures, which are conditions that cause the assembly lubrication to evaporate and be removed by the air).

Lubrication is performed by lubricating the air that flows through the components with mineral oil that does not contain additives that could corrode the seals.

The task of the **LUBRICATORS** is to dose the air with a certain quantity of nebulized oil.

The air itself transports the oil along stretches of piping, the length of which increases as the size of the drops of the micro-mist decrease.

The lubricators are made up of:

- a body with threaded ports, containing a Venturi connected by means of a small tube
- a cup, to be screwed onto the body, into which the lubricating oil is poured.

The air, entering from the supply opening, crosses the Venturi constriction, where it creates a reduction in pressure that draws the oil from the cup through the small tube, nebulizing it and sending into the pipes.

An adjustment screw makes it possible to regulate the quantity of oil introduced.

There is a **minimum operating flow**, characteristic of each range of lubricators, beneath which a sufficient fall in pressure is not achieved in the constriction and consequently the oil is not drawn.

## CHOOSING THE SIZE OF THE LUBRICATORS

The characteristic “**FALL IN PRESSURE - FLOW**” curves are used for this purpose as they permit the rapid identification of the range of use.

It is advisable to choose the lubricator in such a way as to limit the falls of pressure.

The flows provided are, as always, associated with the dimensions and thus to the ports of the lubricator.



Standard executions			
Version	Symbol	Code	Item
Filter-regulator + lubricator		090100	A14FRRL
Filter-regulator		090101	A14FRR
Filter		090102	A14F
Regulator		090103	A14R
Lubricator		090104	A14L



Options	Suffix
Filter 5 µ cartridge	5
Metal cup	TM
With regulation range 0,5÷4 bar	04

Series of modular units with the following standard features :

- Regulators with relieving valve
- Filters standard with 25µ cartridge
- Filters with semi-automatic condensate drain
- Cup with protection

The gauges are to be ordered separately; for gauges see from page 3.50.1

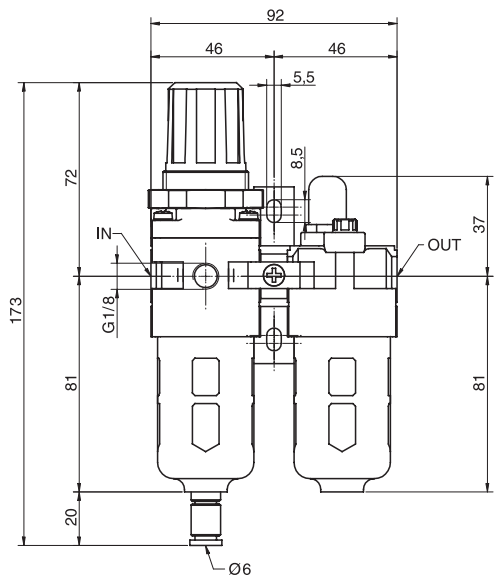
For mounting accessories, assembling kits and spare parts see from page 3.5.1

How to order: A14FRR5TM

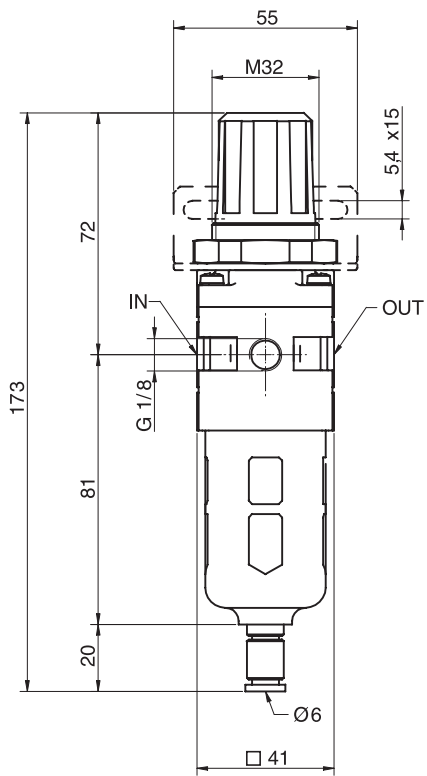
A14FRR	5	TM
Version	Option	Option

Technical data	
Fluid	Compressed air
Maximum pressure	10 bar
Regulation range	0,5 ÷ 8,5 bar
Flow at 6 bar (NI/min)	A14FRRL = 500; A14FRR = 750; A14F = 750; A14R = 550; A14L = 800
Temperature range	0 ÷ 60 °C
Suggested oil	With ISO VG 32 viscosity conforming to ISO 3448 standards
Cup capacity	Filter : 15 cm <sup>3</sup> Lubricator : 25 cm <sup>3</sup>
Filtering element	Standard 25 µ - On request 5 µ
Condense drain	Standard semi-automatic
Materials	<div> Body and cup protection: Painted aluminium  Regulation group: Plastic  Condense drain: Nickel plated brass  Filtering element: Sintered bronze  Diaphragm: Nitrile rubber (NBR)  Cup and sight glass: Polycarbonate  Springs: Steel </div>

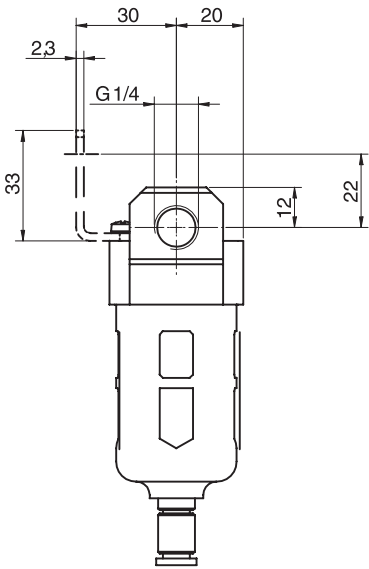
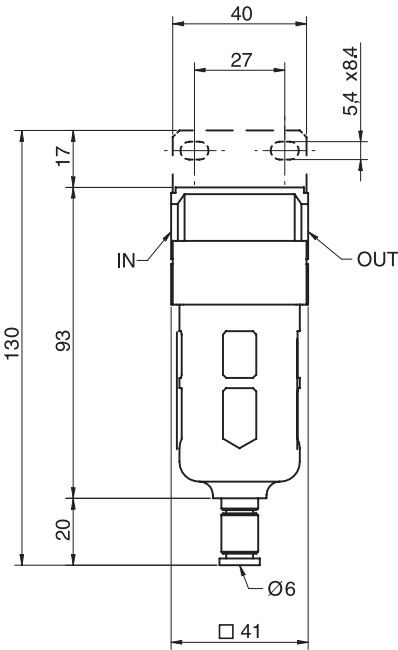




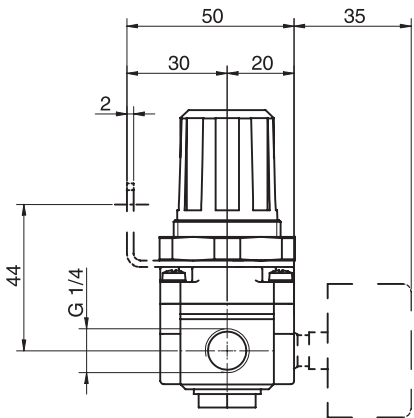
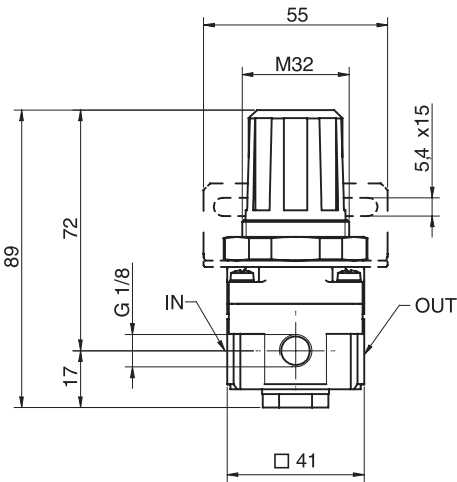
Version	Symbol	Code	Item
Filter-regulator + lubricator		090100	A14FRRL



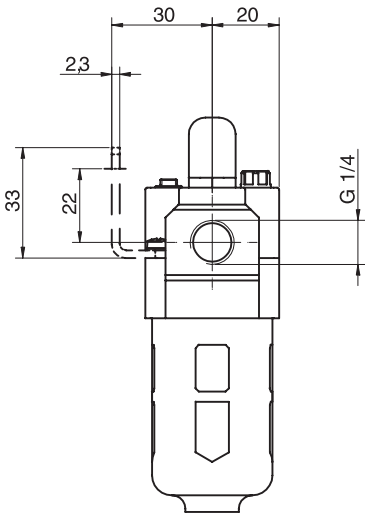
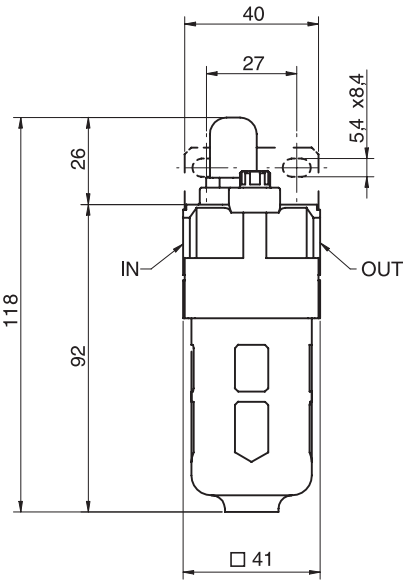
Version	Symbol	Code	Item
Filter-regulator		090101	A14FRR



Version	Symbol	Code	Item
Filter		090102	A14F



Version	Symbol	Code	Item
Regulator		090103	A14R



Version	Symbol	Code	Item
Lubricator		090104	A14L

Standard executions			
Version	Symbol	Code	Item
Filter-regulator + lubricator		090105	A38FRRL
Filter-regulator		090106	A38FRR
Filter		090107	A38F
Regulator		090108	A38R
Lubricator		090109	A38L



Options	Suffix
Filter 5 µ cartridge	5
Automatic condense drain for filters	SA
Metal cup	TM
With regulation range 0,5÷4 bar	04

Series of modular units with the following standard features :

- Regulators with relieving valve
- Filters standard with 25µ cartridge
- Filters with semi-automatic condense drain
- Cup with protection

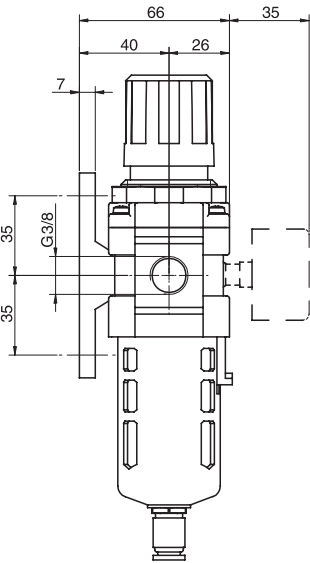
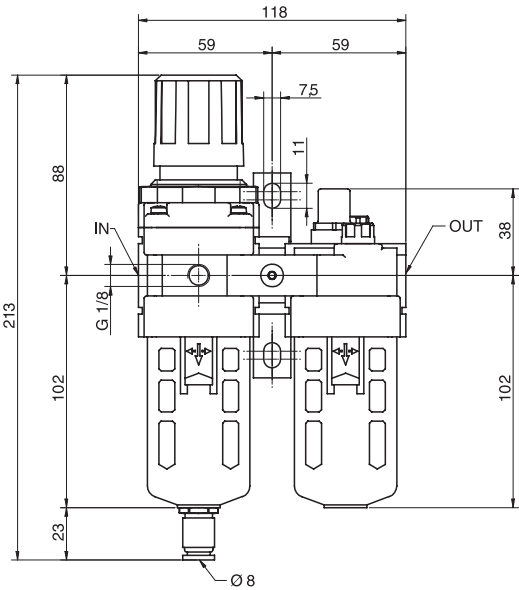
The gauges are to be ordered separately; for gauges see from page 3.50.1

For mounting accessories, assembling kits and spare parts see from page 3.5.1

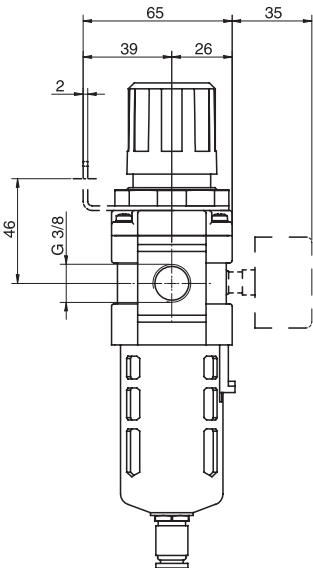
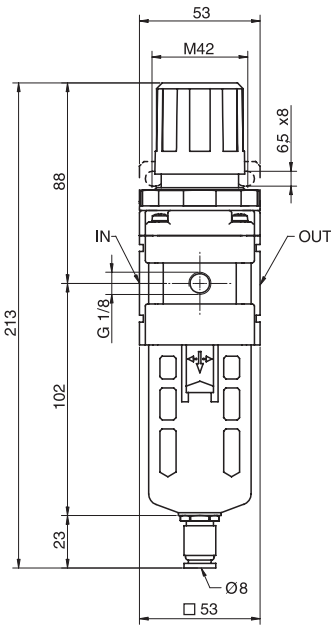
How to order: A38F5SA

A38F	5	SA
Version	Option	Option

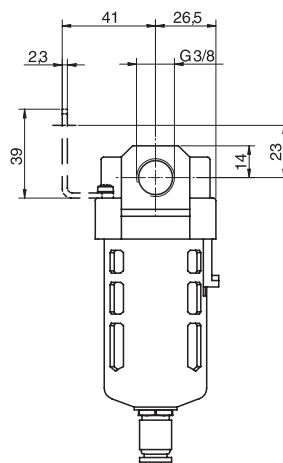
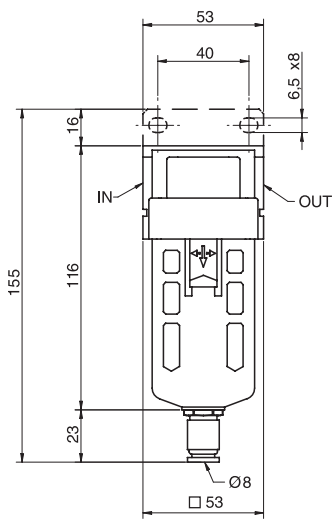
Technical data	
Fluid	Compressed air
Maximum pressure	10 bar
Regulation range	0,5 ÷ 8,5 bar
Flow at 6 bar (NI/min)	A38FRRL = 1700; A38FRR = 2000; A38F = 1500; A38R = 2500; A38L = 1700
Temperature range	0 ÷ 60 °C
Suggested oil	With ISO VG 32 viscosity conforming to ISO 3448 standards
Cup capacity	Filter : 20 cm <sup>3</sup> Lubricator : 50 cm <sup>3</sup>
Filtering element	Standard 25 µ - On request 5 µ
Condense drain	Standard semi-automatic - On request automatic
Materials	<div> <div>Body and cup protection:</div> <div>Regulation group:</div> <div>Condense drain</div> <div>Filtering element</div> <div>Diaphragm</div> <div>Cup and sight glass</div> <div>Springs</div> </div> <div> <div>Painted aluminium</div> <div>Plastic</div> <div>Nickel plated brass</div> <div>Sintered bronze</div> <div>Nitrile rubber (NBR)</div> <div>Polycarbonate</div> <div>Steel</div> </div>



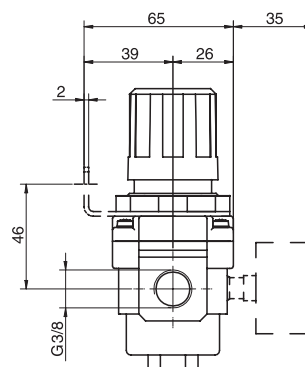
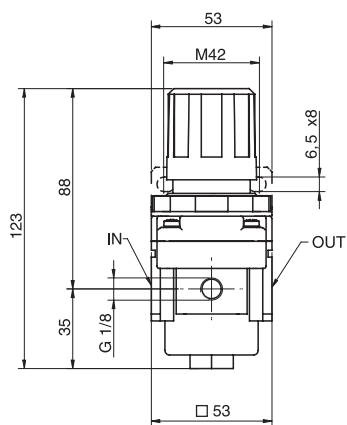
Version	Symbol	Code	Item
Filter-regulator + lubricator		090105	A38FRRL



Version	Symbol	Code	Item
Filter-regulator		090106	A38FRR

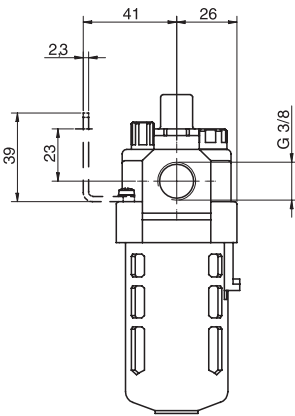
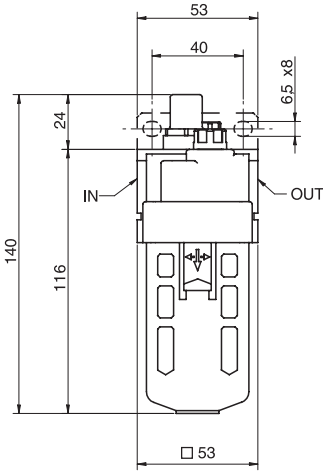



Version	Symbol	Code	Item
Filter		090107	A38F



Version	Symbol	Code	Item
Regulator		090108	A38R





Version	Symbol	Code	Item
Lubricator		090109	A38L

Standard executions			
Version	Symbol	Code	Item
Filter-regulator + lubricator		090110	A12FRRL
Filter-regulator		090111	A12FRR
Filter		090112	A12F
Regulator		090113	A12R
Lubricator		090114	A12L



Options	Suffix
Filter 5 µ cartridge	5
Automatic condense drain for filters	SA
Metal cup	TM
With regulation range 0,5÷4 bar	04

Series of modular units with the following standard features :

- Regulators with relieving valve
- Filters standard with 25µ cartridge
- Filters with semi-automatic condense drain
- Cup with protection

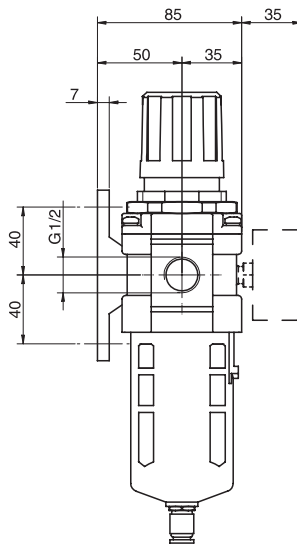
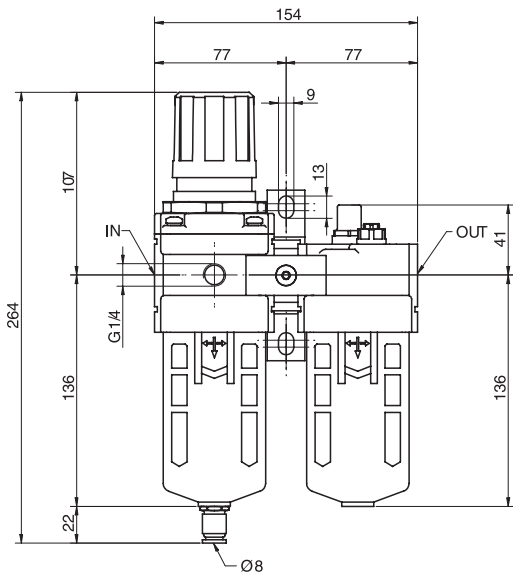
The gauges are to be ordered separately; for gauges see from page 3.50.1

For mounting accessories, assembling kits and spare parts see from page 3.5.1

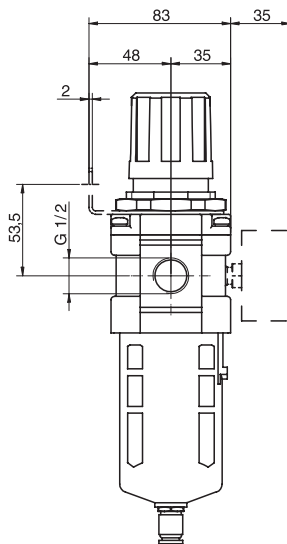
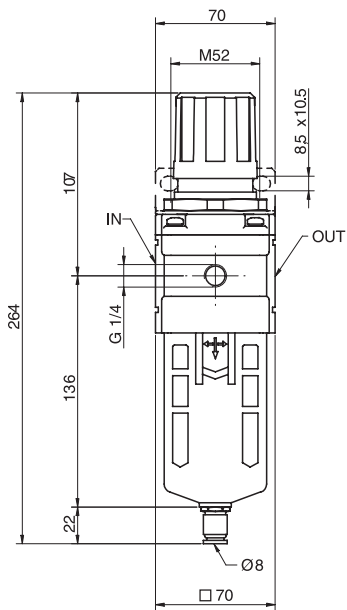
How to order: A12FRR04SA

A12FRR	04	SA
Version	Option	Option

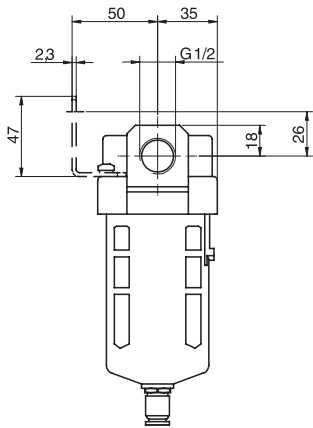
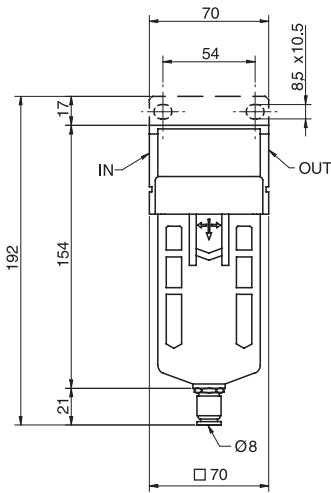
Technical data	
Fluid	Compressed air
Maximum pressure	10 bar
Regulation range	0,5 ÷ 8,5 bar
Flow at 6 bar (NI/min)	A12FRRL = 3000; A12FRR = 4000; A12F = 4000; A12R = 6000; A12L = 5000
Temperature range	0 ÷ 60 °C
Suggested oil	With ISO VG 32 viscosity conforming to ISO 3448 standards
Cup capacity	Filter : 45 cm <sup>3</sup> Lubricator : 130 cm <sup>3</sup>
Filtering element	Standard 25 µ - On request 5 µ
Condense drain	Standard semi-automatic - On request automatic
Materials	<div> <div>Body and cup protection:</div> <div>Regulation group:</div> <div>Condense drain</div> <div>Filtering element</div> <div>Diaphragm</div> <div>Cup and sight glass</div> <div>Springs</div> </div> <div> <div>Painted aluminium</div> <div>Plastic</div> <div>Nickel plated brass</div> <div>Sintered bronze</div> <div>Nitrile rubber (NBR)</div> <div>Polycarbonate</div> <div>Steel</div> </div>



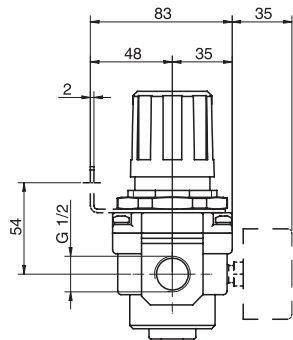
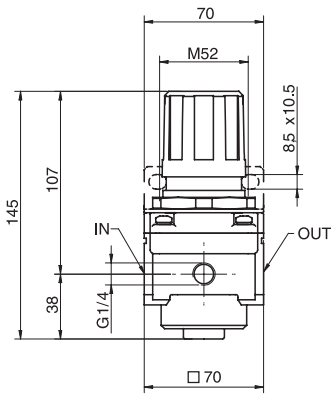
Version	Symbol	Code	Item
Filter-regulator + lubricator		090110	A12FRRL



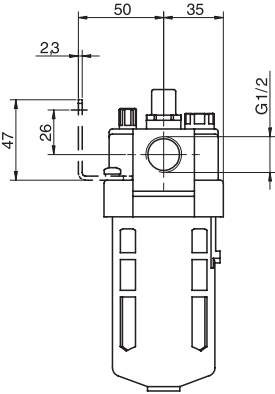
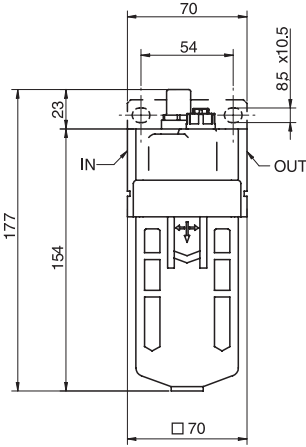
Version	Symbol	Code	Item
Filter-regulator		090111	A12FRR




Version	Symbol	Code	Item
Filter		090112	A12F



Version	Symbol	Code	Item
Regulator		090113	A12R



Version	Symbol	Code	Item
Lubricator		090114	A12L

Standard executions			
Version	Symbol	Code	Item
Filter-regulator + lubricator		090115	A01FRRL
Filter-regulator		090116	A01FRR
Filter		090117	A01F
Regulator		090118	A01R
Lubricator		090119	A01L



Options	Suffix
Filter 5 $\mu$ cartridge	5
Automatic condense drain for filters	SA
Metal cup	TM
With regulation range 0,5÷4 bar	04

Series of modular units with the following standard features :

- Regulators with relieving valve
- Filters standard with 25 $\mu$  cartridge
- Filters with semi-automatic condense drain
- Cup with protection

The gauges are to be ordered separately; for gauges see from page 3.50.1

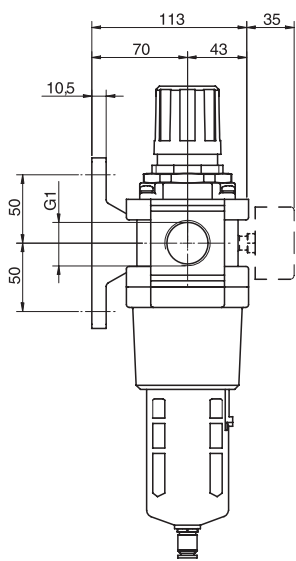
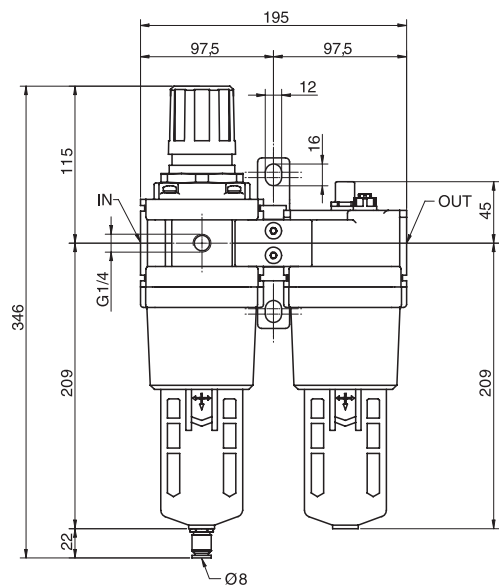
For mounting accessories, assembling kits and spare parts see from page 3.5.1

How to order: A01FTMSA

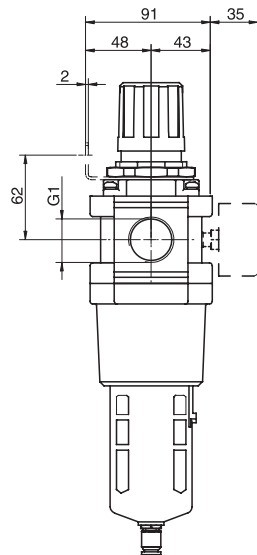
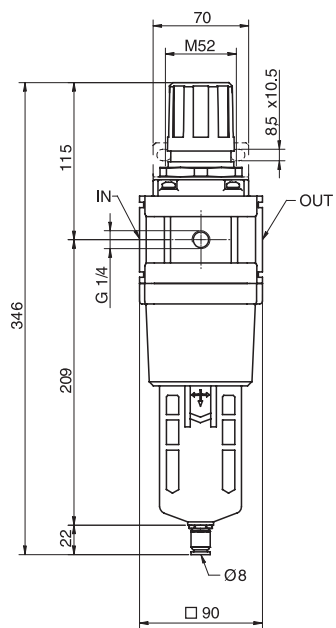
A01F	TM	SA
Version	Option	Option

Technical data	
Fluid	Compressed air
Maximum pressure	10 bar
Regulation range	0,5 ÷ 8,5 bar
Flow at 6 bar (NI/min)	A01FRRL = 4000; A101FRR = 5500; A01F = 7000; A01R = 8000; A01L = 7000
Temperature range	0 ÷ 60 °C
Suggested oil	With ISO VG 32 viscosity conforming to ISO 3448 standards
Cup capacity	Filter : 130 cm <sup>3</sup> Lubricator : 130 cm <sup>3</sup>
Filtering element	Standard 25 $\mu$ - On request 5 $\mu$
Condense drain	Standard semi-automatic - On request automatic
Materials	<div> Body and cup protection: Painted aluminium  Regulation group: Plastic  Condense drain: Nickel plated brass  Filtering element: Sintered bronze  Diaphragm: Nitrile rubber (NBR)  Cup and sight glass: Polycarbonate  Springs: Steel </div>

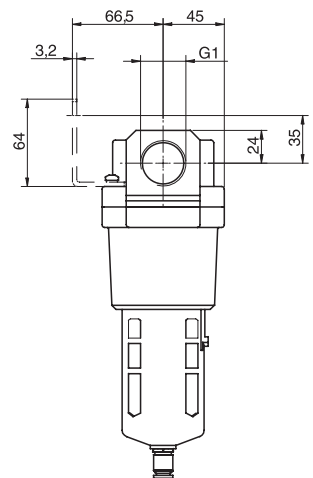
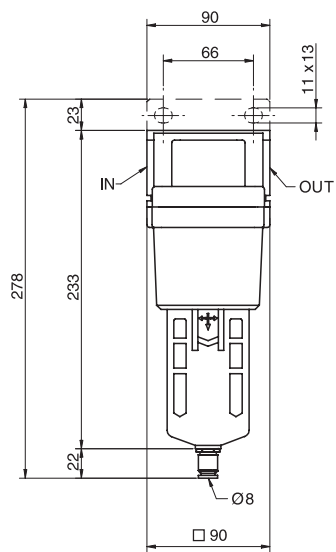




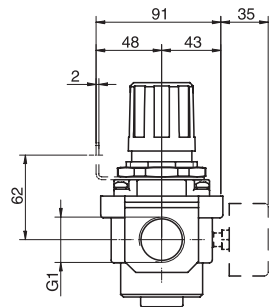
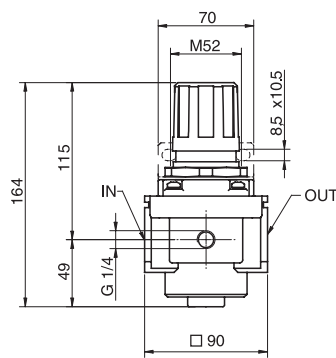
Version	Symbol	Code	Item
Filter-regulator + lubricator		090115	A01FRRL



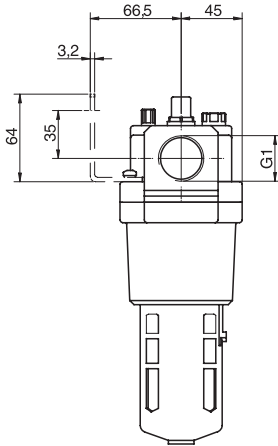
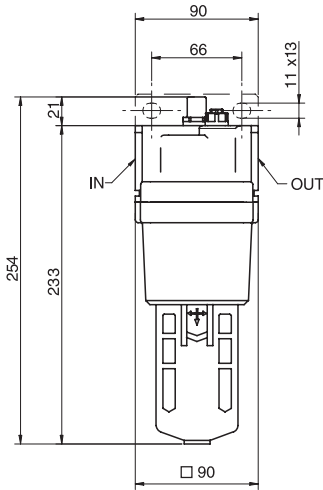
Version	Symbol	Code	Item
Filter-regulator		090116	A01FRR




Version	Symbol	Code	Item
Filter		090117	A01F

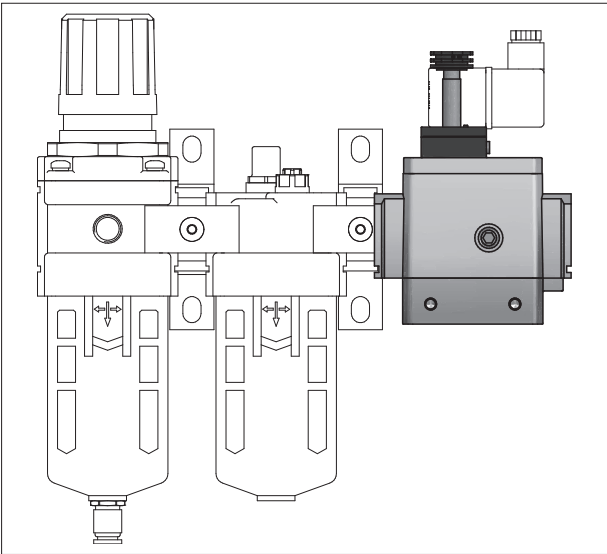


Version	Symbol	Code	Item
Regulator		090118	A01R



Version	Symbol	Code	Item
Lubricator		090119	A01L

Standard executions			
Version	Symbol	Type	Item
Electric 1/4		090231	AVP14E
Electric 3/8		090232	AVP38E
Electric 1/2		090233	AVP12E
Pneumatic 1/4		090247	AVP14P
Pneumatic 3/8		090248	AVP38P
Pneumatic 1/2		090249	AVP12P



Soft/start valve, for progressive pressurizing the pneumatic lines when switch on.

Is indicated as safety valve, to quickly exhaust the downstream circuit.

- Manual override;
- Exhausting function;
- Low consumption;
- Modular assembly with airline equipment.

For airline equipment see page 3.2.1

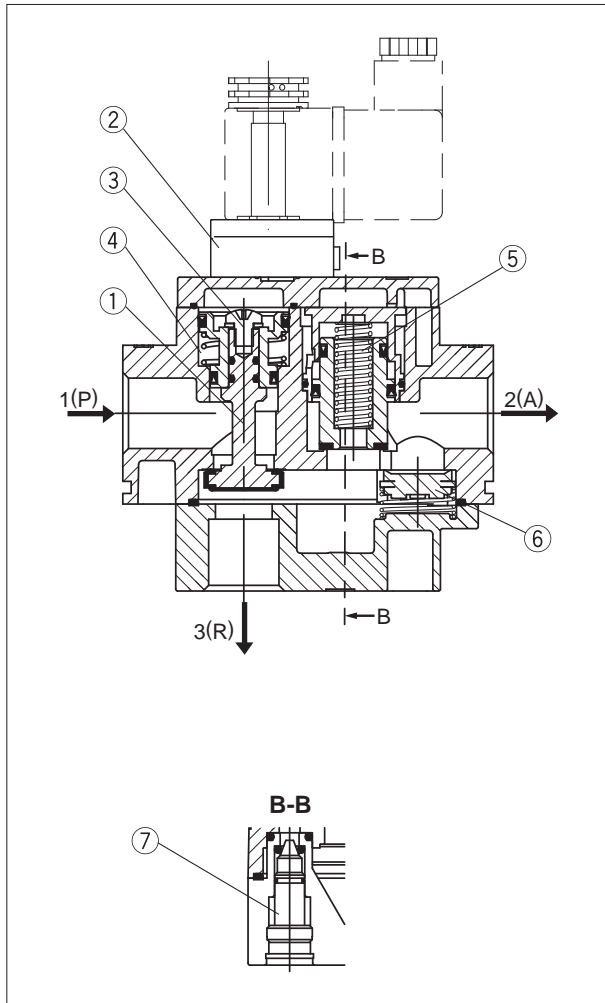
For coils type ASA12... see page 2.200.1

For connector type A122... see page 2.210.20

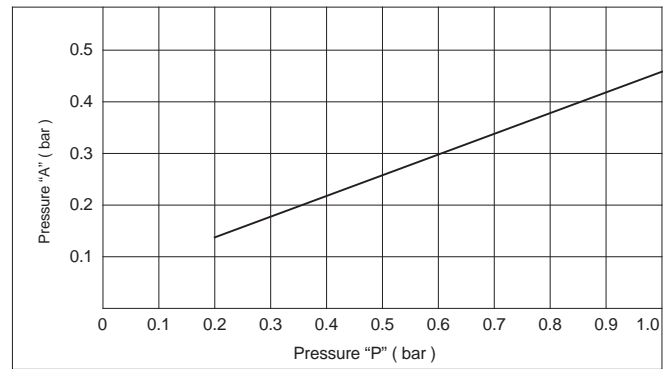
Pressure gauges to be ordered separately, see page 3.50.1

For accessories, assembly kits and spare parts see page 3.5.1

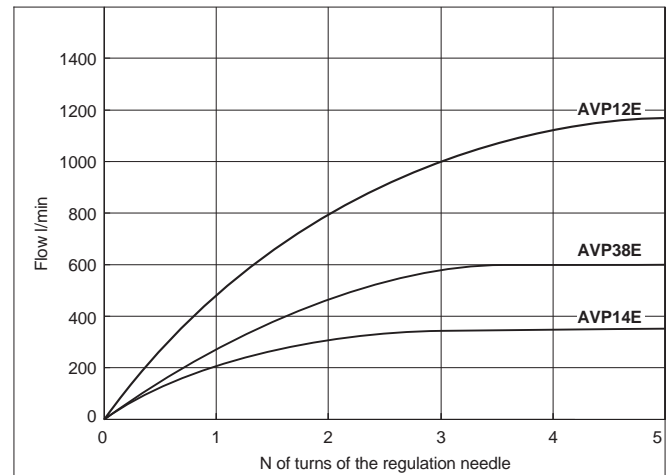
Technical data				
Fluid		Compressed air		
Maximum pressure		15 bar		
Regulation range		0,2 ÷ 10 bar		
Temperature range		0 ÷ 60 °C		
Size		1/4"	3/8"	1/2"
Section	1 (P) → 2(A)	20 mm <sup>2</sup>	37 mm <sup>2</sup>	61 mm <sup>2</sup>
	2 (A) → 3(R)	24 mm <sup>2</sup>	49 mm <sup>2</sup>	76 mm <sup>2</sup>
Gauges mountings		1/8"	1/8"	1/8"
Manual Override		Spring return		
Materials	Body:	Painted aluminium		
	Cover	Painted aluminium		
	End cover	Painted aluminium		
	Piston guide	POM / NBR		
	Seals	NBR		
	Internal parts	Brass / NBR		
	Springs	Stainless steel		



Pressure in the start-up phase of the valve



Flow rates related to the number of turns of the needle – P = 5 bar (P: 5 bar)



## OPERATING CONDITIONS

### Start-up phase

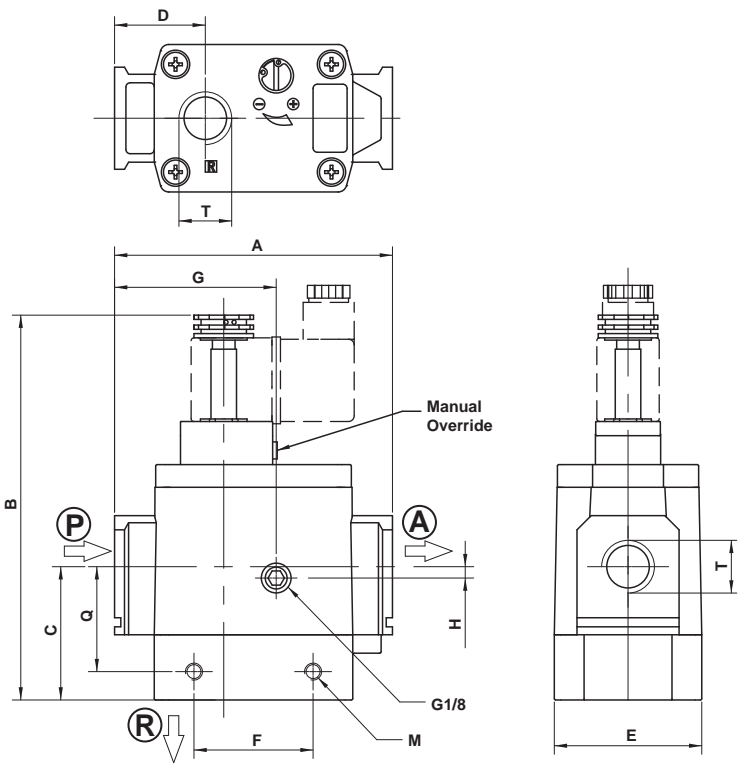
By actuating electro-pilot or pneumatic-pilot ② ( or the manual override ), piloting air will push the poppet ① down opening this way the main power valve and at the same time, closing the exhaust ③.  
Air from inlet ① will go through the regulation needle ⑦ and out to ②.

### Switching and working phase

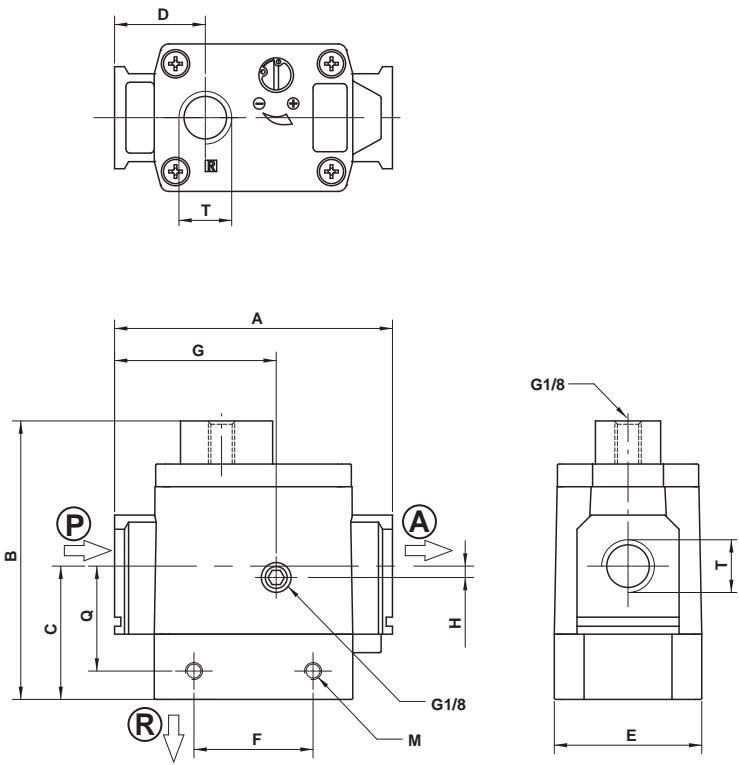
In the moment the pressure difference between ① and ② is  $P(A) \geq \frac{1}{2} P(P)$  the poppet ⑤ fully open and outlet pressure ② rapidly increase until equalize inlet one at ①.  
Soft-start valve will not represent any obstacle for the air-flow going through it.

### Closing and exhausting phase

By deactivating electro-pilot or pneumatic pilot ② ( or the manual override ), the poppet ① will reposition stopping the air from inlet ① and contemporary exhaust the downstream air in the circuit from ③.



Code	Item	Size	A	B	C	D	E	G	H	F	Q	M	T
090231	AVP14E	1/4	66	114	31	22	40	38	0	29	23,5	M4	1/4"
090232	AVP38E	3/8	76	131	36	24	48	43	2	28	27,5	M5	3/8"
090233	AVP12E	1/2	98	146	47	32	52	57	3	42	42	M6	1/2"

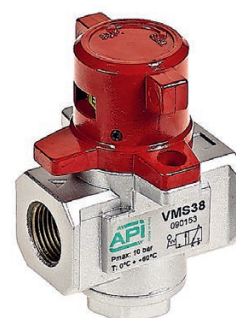
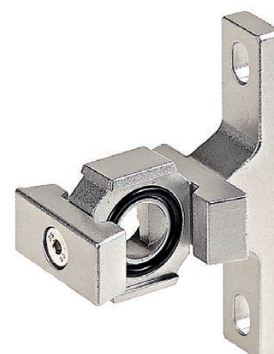
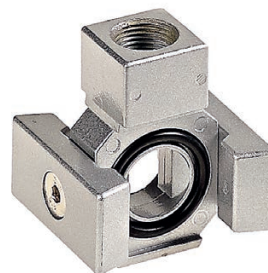


Code	Item	Size	A	B	C	D	E	G	H	F	Q	M	T
090247	AVP14P	1/4	66	75	31	22	40	38	0	29	23,5	M4	1/4"
090248	AVP38P	3/8	76	84	36	24	48	43	2	28	27,5	M5	3/8"
090249	AVP12P	1/2	98	90	47	32	52	57	3	42	42	M6	1/2"

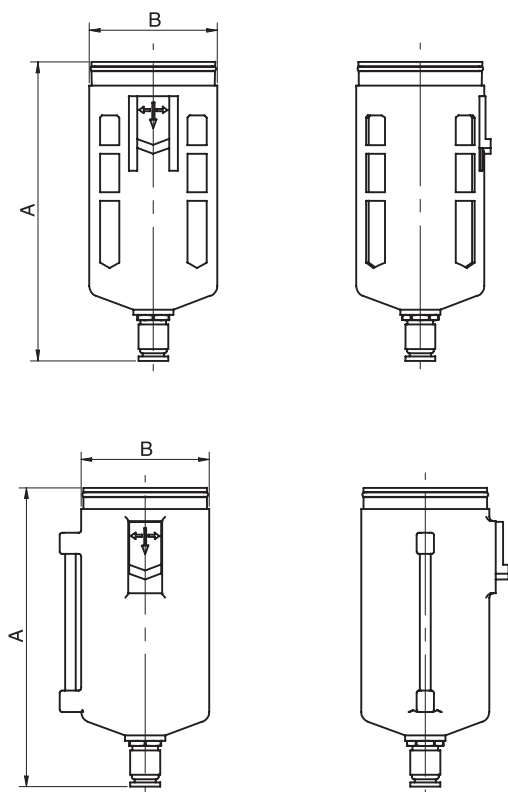




Standard executions	
Version	Type
TMetal cup for filter	TM..F
Metal cup for lubricator	TM..L
"T" porting block	DT..
"L" spacer with bracket	DSL..
"L" bracket	SL..
"T" spacer with bracket	DST..
"T" bracket	ST..
Bracket for regulator and filter-regulator	SR..
Bracket for filter and lubricator	SFL..
Spacer	D..
Manual condense drain valve	VMS..
Polycarbonate cup for filter with metal protection	TP..F
Polycarbonate cup for lubricator with metal protection	TP..L
Standard filter cartridge (25 µ)	CA../25
Filter cartridge 5 µ	CA../5
Diaphragm for regulator	DF..
Oil regulation kit	OL..
Cup seal	ORT..



Cup for filter



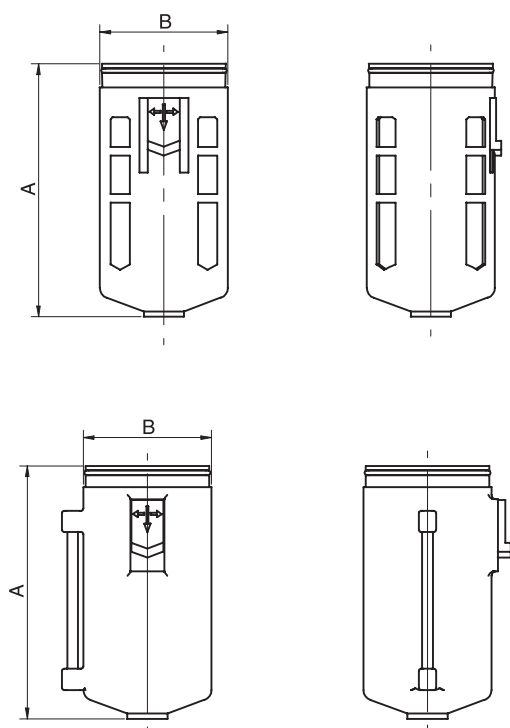
Polycarbonate  
with metal protection

Code	Size	Item	A	B
090155	1/4"	TP14F	92	36
090156	3/8"	TP38F	114	44
090157	1/2"	TP12F	140	60
090158	1"	TP01F	140	60

Metal cup

Code	Size	Item	A	B
090121	1/4"	TM14F	92	36
090122	3/8"	TM38F	114	44
090123	1/2"	TM12F	140	60
090124	1"	TM01F	140	60

Cup for lubricator



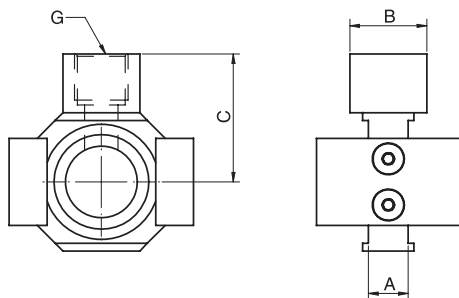
Polycarbonate  
with metal protection

Code	Size	Item	A	B
090159	1/4"	TP14L	72	36
090160	3/8"	TP38L	90	44
090161	1/2"	TP12L	118	60
090162	1"	TP01L	118	60

Metal cup

Code	Size	Item	A	B
090125	1/4"	TM14L	72	36
090126	3/8"	TM38L	90	44
090127	1/2"	TM12L	118	60
090128	1"	TM01L	118	60

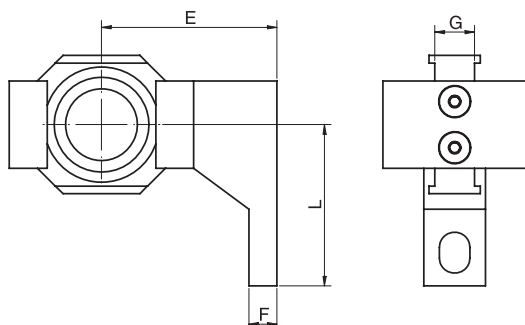
"T" porting block (only for F+RR+L)



Code	Item	Size	A	B	C	G
090129	DT14	1/4"	10	19	29	1/4"
090130	DT38	3/8"	11	19	33	1/4"
090131	DT12	1/2"	14	24	39	3/8"
090132	DT01	1"	15	30	50,5	1/2"

It can only be mounted between the filter and regulator

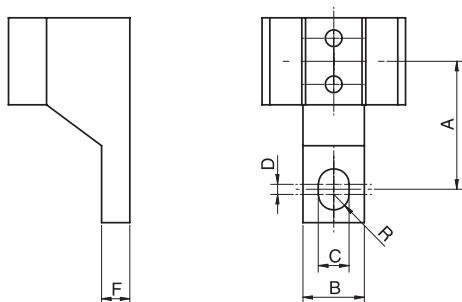
"L" spacer with bracket



Code	Item	Size	E	F	L	G
090133	DSL14	1/4"	30	5	33	10
090134	DSL38	3/8"	41	7	45	11
090135	DSL12	1/2"	50	7	50	14
090136	DSL01	1"	69,8	10,5	63	15

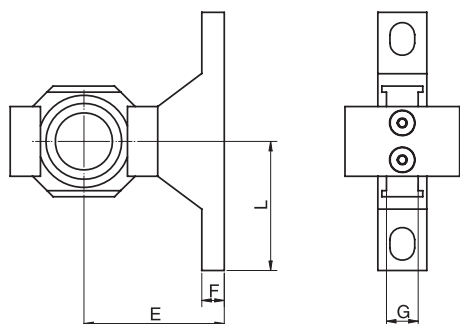
For bracket dimensions see below table (type SL)

"L" bracket



Code	Item	Size	A	B	C	D	F	R
090163	SL14	1/4"	24	15	5,5	3	5	2,75
090164	SL38	3/8"	35	16	7	4	7	3,5
090165	SL12	1/2"	40	22	9	4	7	4,5
090166	SL01	1"	50	23	12	4	10,5	6

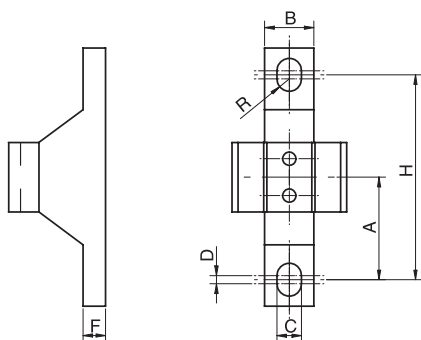
"T" spacer with bracket



Code	Item	Size	E	F	L	G
090137	DST14	1/4"	30	5	33	10
090138	DST38	3/8"	41	7	45	11
090139	DST12	1/2"	50	7	50	14
090140	DST01	1"	69,8	10,5	63	15

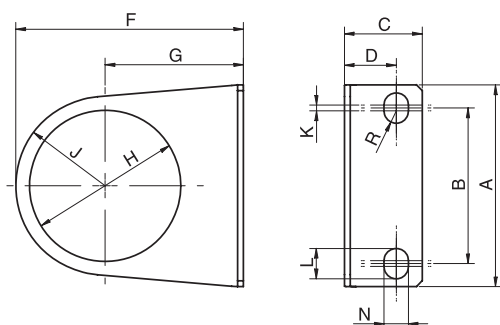
For bracket dimensions see next page table (type ST)

"T" bracket



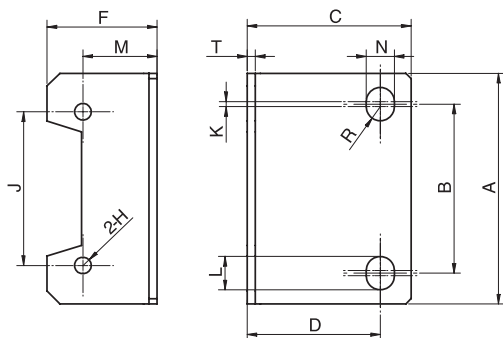
Code	Item	Size	A	B	C	D	F	H	R
090167	ST14	1/4"	24	15	5,5	3	5	48	2,75
090168	ST38	3/8"	35	16	7	4	7	70	3,5
090169	ST12	1/2"	40	22	9	4	7	80	4,5
090170	ST01	1"	50	23	12	4	10,5	100	6

Bracket for regulator and filter-regulator



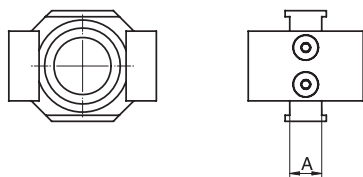
Code	Item	Size	A	B	C	D	F	G	H	J	K	L	N	R
090308	SR700-400	1/8"-1/4"	44,5	24	20	12	55,5	35,5	30	20	6	12	6	3
090141	SR14	1/4"	55	34	25	19	50	30	33,5	20	1	15	5,4	2,7
090142	SR38	3/8"	53	40	21,5	14	64	39	42,5	25	1,5	8	6,5	3,25
090143	SR1201	1/2" - 1"	70	54	27	18	79,2	49,2	52,5	30	2	10,5	8,5	4,25

Bracket for filter and lubricator



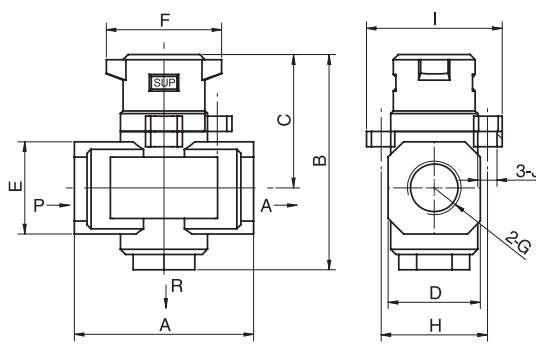
Code	Item	Size	A	B	C	D	F	ΦH	J	K	L	M	N	R	T
090144	SFL14	1/4"	40	27	33	27	18	4,5	26	3	8,4	14	5,4	2,7	2,3
090145	SFL38	3/8"	53	40	39	32	22,5	4,5	35	1,5	8	19	6,5	3,25	2,3
090146	SFL12	1/2"	70	54	47	38	31,5	5,5	47	2	10,5	20	8,5	4,25	2,3
090147	SFL01	1"	90	66	64	52	43	6,5	60	2	13	29	11	5,5	3,2

Spacer



Code	Item	Size	A
090148	D14	1/4"	10
090149	D38	3/8"	11
090150	D12	1/2"	14
090151	D01	1"	15

Manual condense drain valve



Code	Item	Size	G	R	A	B	C	D	E	F	H	I	J
090152	VMS14	1/4"	G1/4	G1/8	40	59	39	28	22	40	32	41	Ø6
090153	VMS38	3/8"	G3/8	G1/4	53	78	49	30	28	45	41,5	53	Ø7,5
090154	VMS12	1/2"	G1/2	G3/8	70	84	52	36	36	45	41,5	53	Ø7,5

Standard filter 25µ cartridge

Code	Size	Item
090171	1/4"	CA14/25
090172	3/8"	CA38/25
090173	1/2"	CA12/25
090174	1"	CA01/25

Filter 5µ cartridge

Code	Size	Item
090175	1/4"	CA14/5
090176	3/8"	CA38/5
090177	1/2"	CA12/5
090178	1"	CA01/5

Diaphragm for regulator

Code	Size	Item
090179	1/4"	DF14
090180	3/8"	DF38
090181	1/2"	DF12
090182	1"	DF01

Oil regulation kit

Code	Size	Item
090183	1/4"	OL14
090184	3/8"	OL38
090184	1/2"	OL12
090184	1"	OL01

Seals Cup

Code	Size	Item
090187	1/4"	ORT14
090188	3/8"	ORT38
090189	1/2"	ORT12
090190	1"	ORT01



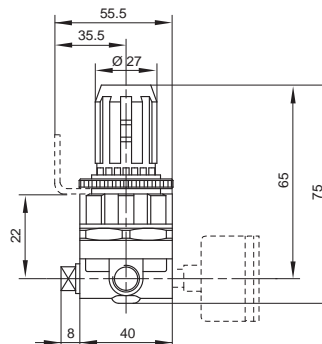
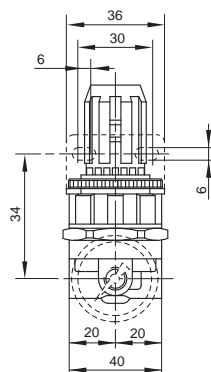
Standard executions			
Version	Symbol	Code	Item
1/4"		090305	AC400-1/4RR

Technical data	
Fluid	Compressed air
Pressure	Max 10 bar
Regulation range	0.5 ÷ 8 bar
Flow	500 l/min
Temperature	0 ÷ 60°C
Materials	Knob: Acetal resin Body: Brass Seals: Nitrile rubber (NBR)



Series of microregulators, standard with relieving valve.  
Used to reduce and keep constant the out pressure.  
Standard without gauge.

For gauges see page 3.50.1.  
For mounting bracket see page 3.5.4 (SR700-400).



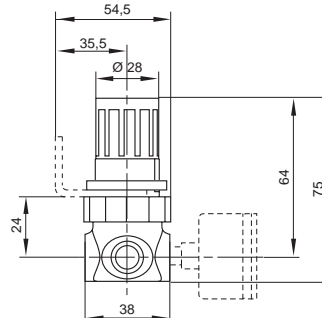
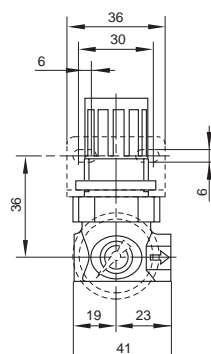
Standard executions			
Version	Symbol	Code	Item
1/8"		090307	AC700-1/8RR
1/4"		090306	AC700-1/4RR

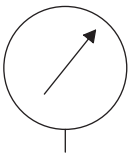
Technical data	
Fluid	Compressed air
Pressure	Max 15 bar
Regulation range	0,5 ÷ 8,5 bar
Flow	1/8" = 390 l/min - 1/4" = 420 l/min
Temperature	0 ÷ 60°C
Materials	Knob: Acetal resin Body: Zinc Seals: Nitrile rubber (NBR)



Series of microregulators, compact design, full flow gauge port.  
Standard relieving models, snap action knob locks pressure setting when pushed in.  
Standard without gauge.

For gauges see page 3.50.1.  
For mounting bracket see page 3.5.4 (SR700-400).



Standard executions		
Version	Symbol	Tipo
With rear connection		M
With radial connection		MR
With rear connection and flange (3 holes)		MF
With rear connection and panel bracket		MP

Dial Ø	40	50	63
Code	40	50	63

Connection	1/8"	1/4"
Code	A	B

Standard scales (bar)	-1 ÷ 0	0 ÷ 1	0 ÷ 2,5	0 ÷ 4	0 ÷ 6	0 ÷ 10	0 ÷ 12
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Series of dry pressure-gauges available in various versions and scales.

Suitable to measure pressure in pneumatic installations.

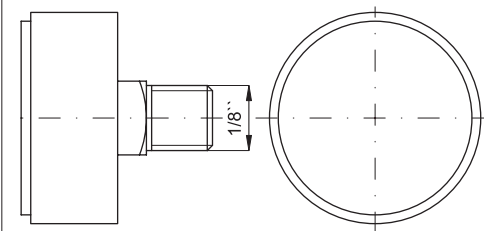
\* How to order: M40A0 ÷ 12

M	40	A	0 ÷ 12
Type	Dial code	Connection code	Scale

\* For standard items, codes and dimensions see table from page 3.50.2.

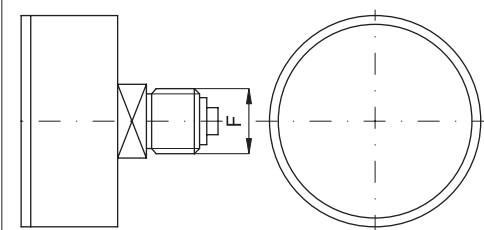
Technical data				
Fluid	Compressed air			
Pressure	Constant: till 3/4 of the full scale			
	Variable: within 2/3 of the full scale			
	Pulsed: till the full scale			
Temperature range	-20 °C ÷ + 60°C			
Protection degree	IP41			
Precision	Class CI 1.6			
Threads	UNI-ISO 7/1 (BSPT)			
Materials		Type: M-MR	Type: MF	Type: MP
	Housing	Black ABS	Chrome plated steel Black painted steel	Chrome plated steel
	Screen	Kostil		
	Connection	Brass OT58		
	Elastic element	Tubular spring in copper alloy		
	Moviment	Brass		
	Dial	White ABS with double scale (black = bar; red = PSI)		
	Welding	Sn/Pb alloy		

Type: **M40A**



Code	Item	Scale (bar)
028501	M40A-1÷0	-1 ÷ 0
028601	M40A0÷1	0 ÷ 1
028651	M40A0÷2,5	0 ÷ 2,5
028701	M40A0÷4	0 ÷ 4
028801	M40A0÷6	0 ÷ 6
028851	M40A0÷10	0 ÷ 10
028901	M40A0÷12	0 ÷ 12

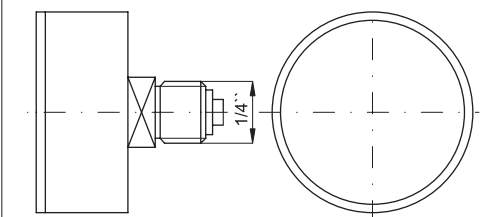
Type: **M50**



Code	Item	Scale (bar)	F
028502	M50A-1÷0	-1 ÷ 0	1/8"
028602	M50A0÷1	0 ÷ 1	
028900	M50A0÷2,5	0 ÷ 2,5	
028702	M50A0÷4	0 ÷ 4	
028802	M50A0÷6	0 ÷ 6	
028915	M50A0÷10	0 ÷ 10	
028902	M50A0÷12	0 ÷ 12	

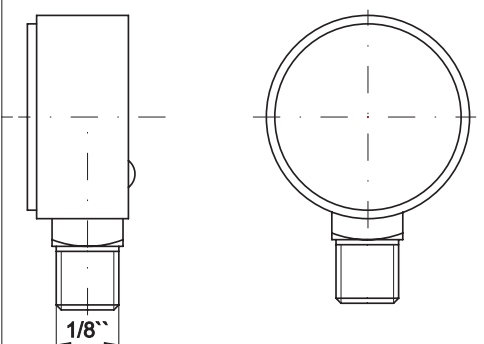
Code	Item	Scale (bar)	F
028925	M50B-1÷0	-1 ÷ 0	1/4"
028972	M50B0÷1	0 ÷ 1	
028994	M50B0÷2,5	0 ÷ 2,5	
028917	M50B0÷4	0 ÷ 4	
028992	M50B0÷6	0 ÷ 6	
028993	M50B0÷10	0 ÷ 10	
028913	M50B0÷12	0 ÷ 12	

Type: **M63B**



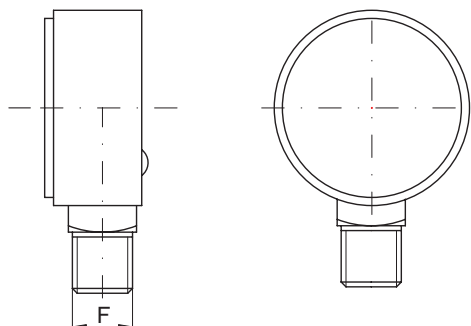
Code	Item	Scale (bar)
028503	M63B-1÷0	-1 ÷ 0
028603	M63B0÷1	0 ÷ 1
028995	M63B0÷2,5	0 ÷ 2,5
028703	M63B0÷4	0 ÷ 4
028803	M63B0÷6	0 ÷ 6
028996	M63B0÷10	0 ÷ 10
028903	M63B0÷12	0 ÷ 12

Type: **MR40A**



Code	Item	Scale (bar)
028504	MR40A-1÷0	-1 ÷ 0
028604	MR40A0÷1	0 ÷ 1
028654	MR40A0÷2,5	0 ÷ 2,5
028704	MR40A0÷4	0 ÷ 4
028804	MR40A0÷6	0 ÷ 6
028997	MR40A0÷10	0 ÷ 10
028904	MR40A0÷12	0 ÷ 12

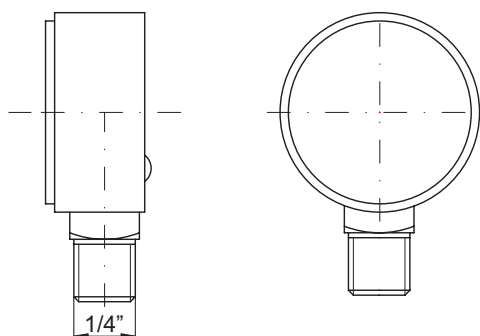
Type:MR50



Code	Item	Scale (bar)	F
028505	MR50A -1÷0	-1 ÷ 0	1/8"
028605	MR50A0÷1	0 ÷ 1	
028998	MR50A0÷2,5	0 ÷ 2,5	
028705	MR50A0÷4	0 ÷ 4	
028805	MR50A0÷6	0 ÷ 6	
028999	MR50A0÷10	0 ÷ 10	
028914	MR50A0÷12	0 ÷ 12	

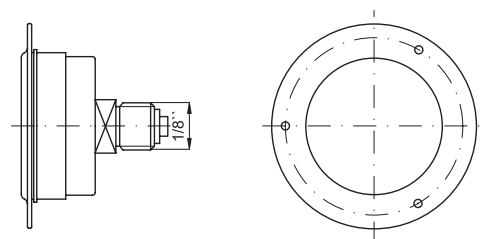
Code	Item	Scale (bar)	F
029000	MR50B -1÷0	-1 ÷ 0	1/4"
029007	MR50B0÷1	0 ÷ 1	
029008	MR50B0÷2,5	0 ÷ 2,5	
028976	MR50B0÷4	0 ÷ 4	
028977	MR50B0÷6	0 ÷ 6	
029009	MR50B0÷10	0 ÷ 10	
028905	MR50B0÷12	0 ÷ 12	

Type:MR63B



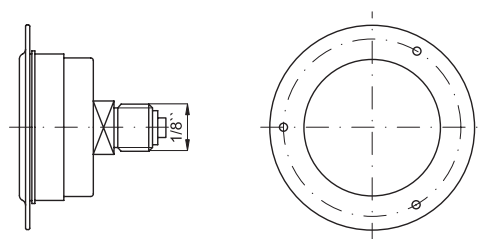
Code	Item	Scale (bar)
028506	MR63B-1÷0	-1 ÷ 0
028606	MR63B0÷1	0 ÷ 1
028656	MR63B0÷2,5	0 ÷ 2,5
028706	MR63B0÷4	0 ÷ 4
028806	MR63B0÷6	0 ÷ 6
029011	MR63B0÷10	0 ÷ 10
028906	MR63B0÷12	0 ÷ 12

Type:MF40A



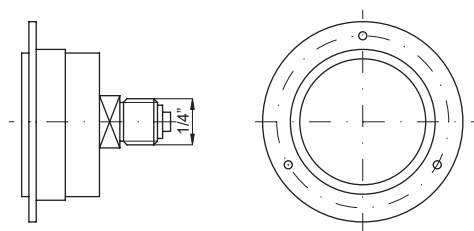
Code	Item	Scale (bar)
028510	MF40A-1÷0	-1 ÷ 0
028610	MF40A0÷1	0 ÷ 1
028663	MF40A0÷2,5	0 ÷ 2,5
028710	MF40A0÷4	0 ÷ 4
028810	MF40A0÷6	0 ÷ 6
029012	MF40A0÷10	0 ÷ 10
028910	MF40A0÷12	0 ÷ 12

Type:MF50A



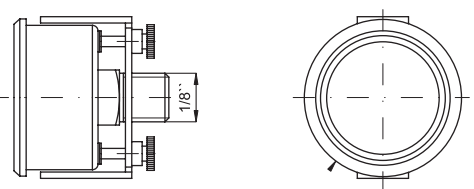
Code	Item	Scale (bar)
029013	MF50A-1÷0	-1 ÷ 0
028611	MF50A0÷1	0 ÷ 1
029014	MF50A0÷2,5	0 ÷ 2,5
028711	MF50A0÷4	0 ÷ 4
028811	MF50A0÷6	0 ÷ 6

Type: **MF63B**



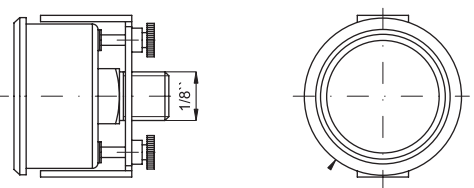
Code	Item	Scale (bar)
028512	MF63B-1÷0	-1 ÷ 0
028612	MF63B0÷1	0 ÷ 1
028662	MF63B0÷2,5	0 ÷ 2,5
028712	MF63B0÷4	0 ÷ 4
028812	MF63B0÷6	0 ÷ 6
028862	MF63B0÷10	0 ÷ 10
028912	MF63B0÷12	0 ÷ 12

Type: **MP40A**



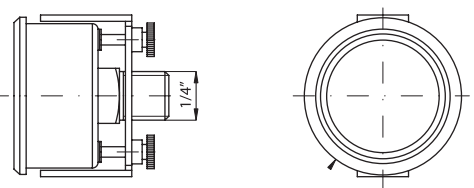
Code	Item	Scale (bar)
028507	MP40A-1÷0	-1 ÷ 0
028607	MP40A0÷1	0 ÷ 1
028713	MP40A0÷2,5	0 ÷ 2,5
028707	MP40A0÷4	0 ÷ 4
028807	MP40A0÷6	0 ÷ 6
029016	MP40A0÷10	0 ÷ 10
028907	MP40A0÷12	0 ÷ 12

Type: **MP50A**



Code	Item	Scale (bar)
028508	MP50A-1÷0	-1 ÷ 0
028608	MP50A0÷1	0 ÷ 1
029017	MP50A0÷2,5	0 ÷ 2,5
028708	MP50A0÷4	0 ÷ 4
028808	MP50A0÷6	0 ÷ 6
029018	MP50A0÷10	0 ÷ 10
028908	MP50A0÷12	0 ÷ 12

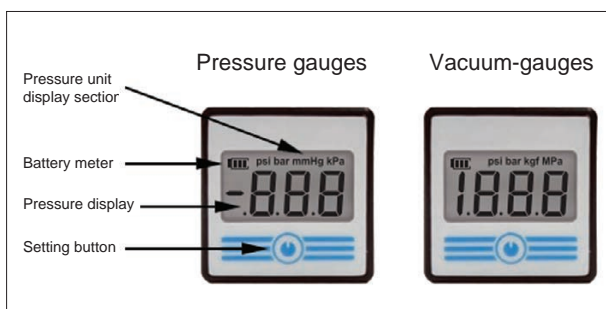
Type: **MP63A**



Code	Item	Scale (bar)
028509	MP63B-1÷0	-1 ÷ 0
028609	MP63B0÷1	0 ÷ 1
028613	MP63B0÷2,5	0 ÷ 2,5
028709	MP63B0÷4	0 ÷ 4
028809	MP63B0÷6	0 ÷ 6
028860	MP63B0÷10	0 ÷ 10
028909	MP63B0÷12	0 ÷ 12

### Standard executions

Version	Symbol	Code	Item
Pressure-gauges 1/8		024805	AKP60P18
Pressure-gauges 1/4		024806	AKP60P14
Vacuum-gauges 1/8		024803	AKP60V18
Vacuum-gauges 1/4		024804	AKP60V14



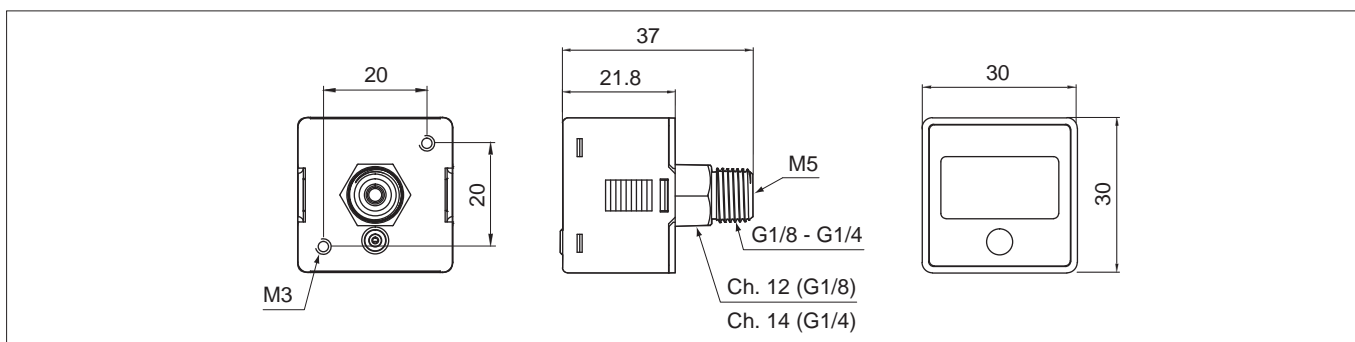
Series of digital pressure and vacuum gauges to detect the pressure in pneumatic circuits.

Pressure reading is easy and fast thanks to the backlight.

These are powered with a lithium battery to simplify installation.

Main characteristics are:

- 6 programmable units to measure pressure (kPa, MPa, kgf/cm<sup>2</sup>, bar, psi, mmHg);
- Measuring units on display;
- Energy saving mode;
- Protection class IP65;



### Technical data

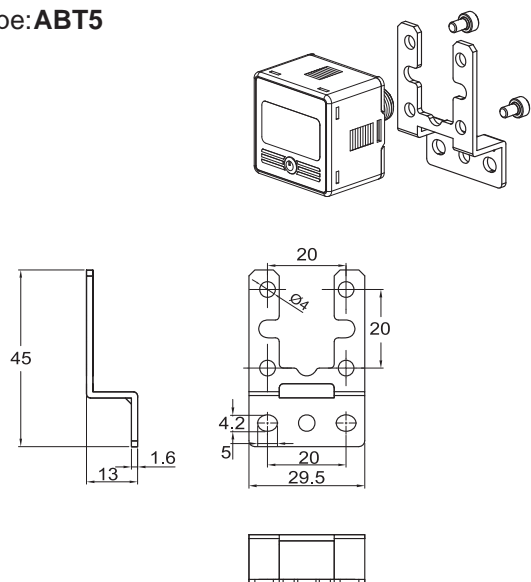
Fluid	Filtered air, incombustible and non-corrosive gases	
Type	Pressure-gauges	Vacuum-gauges
Rated pressure range (*)	0 ÷ 10 bar	-1,01 ÷ 0 bar
Display pressure range (**)	0,1 ÷ 10 bar	-1,01 ÷ + 0,1 bar
Maximum pressure	15 bar	3 bar
Pressure unit	MPa, kgf/cm <sup>2</sup> , bar, psi (user selectable)	kPa, bar, psi, mmHg (user selectable)
Pressure resolution	- 0.001 MPa 0.01 kgf/cm <sup>2</sup> 0.01 bar 0.1 psi -	1 kPa - - 0.01 bar 0.1 psi 1 mmHg
Repeatability	≤ ±0.2% F.S. ±1 digit	≤ ±1% F.S. ±1 digit
LCD display	3 ½ digit, 7 segment	
Protection class	IP65	
Temperature range	0 ÷ 50 °C	
Lithium Battery	CR 2032 (battery life 1 year, 5 times/day) low battery indicator on the display	
Display turn off after	60 sec.	
Ports	G1/8 - M5 G1/4 - M5	
Weight	40 gr	

(\*) Nominal pressure: Pressure range within which technical features of pressure/vacuum gauges are granted.

(\*\*) Displayed pressure: Pressure range possible to display on pressure/vacuum gauges. Pressure values displayed can also be off the nominal pressure range and in this case, technical features are not granted.

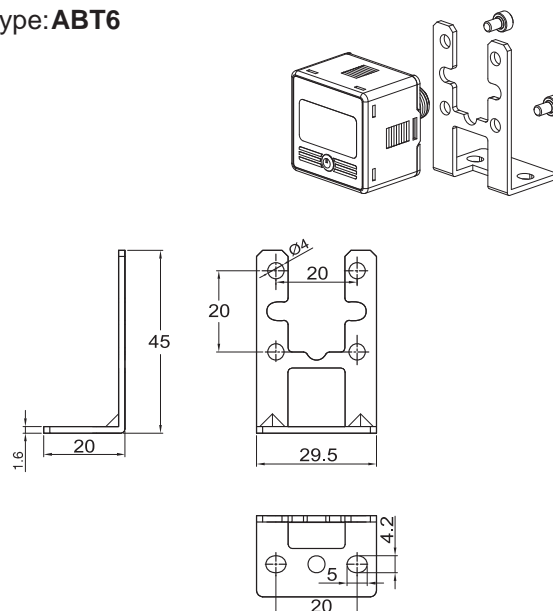
Version	Code	Item
Bracket	024807	ABT5
"L" bracket	024808	ABT6
Panel adapter	024809	APAC
Panel adapter and front protective lid	024802	APAD

Type: **ABT5**



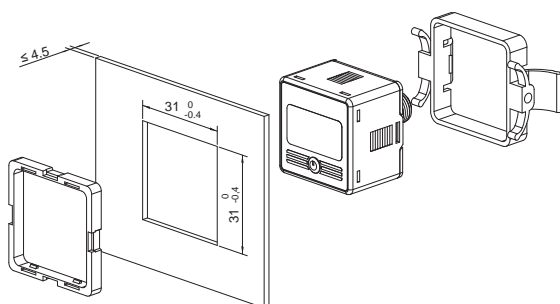
The kit includes 2 screws for fixing the pressure-gauges/vacuum gauges

Type: **ABT6**

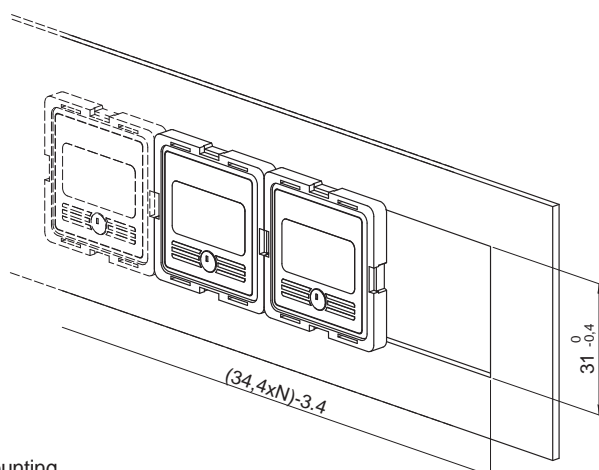
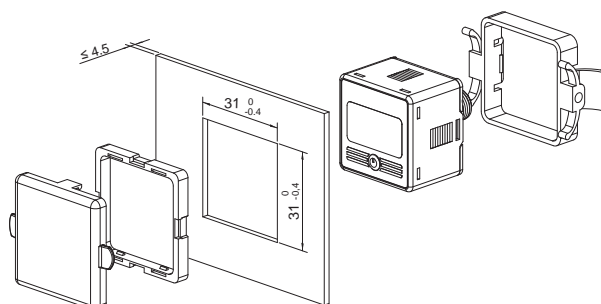


The kit includes 2 screws for fixing the pressure-gauges/vacuum gauges

Type: **APAC**



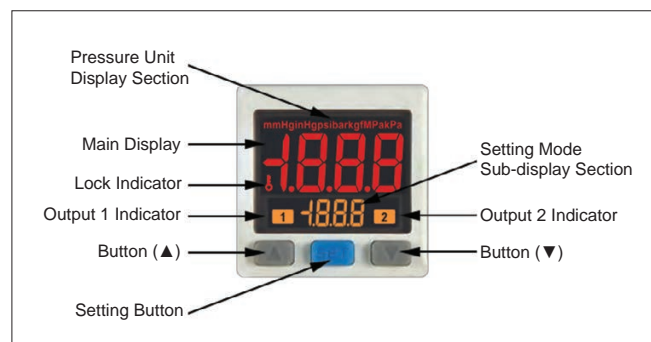
Type: **APAD**



Panel cutout dimension for multiple mounting

### Standard executions

Version	Symbol	Circuit	Code	Item
Digital Pressure Switch Positive Pressure		NPN	024810	AKP43P010F3
		PNP	024811	AKP43P030F3
Digital Pressure Switch Vacuum		NPN	024812	AKP43V010F3
		PNP	024813	AKP43V030F3
Digital Pressure Switch Compound		NPN	024814	AKP43C010F3
		PNP	024815	AKP43C030F3



Series of digital pressure switches allowing to instantly display pressure and transferring of electric signals PNP and NPN easy and fast reading of pressure thanks to backlight.

- Power 12 ÷ 24V DC (±10%).

Main characteristics are:

- 7 programmable units to measure pressure (kPa, MPa, kgf/cm<sup>2</sup>, bar, psi, mmHg, inHg);
- Measuring units on display;
- 3-color LCD Display;

### Technical data

Fluid	Filtered air, incombustible and non-corrosive gases		
Type	Positive	Vacuum	Compound
Rated prassure range (*1)	0 ÷ 10 bar	-1,01 ÷ 0 bar	-1 ÷ 1 bar
Display pressure range (*2)	0,1 ÷ 10 bar	-1,01 ÷ + 0,1 bar	-1,01 ÷ + 1,01 bar
Maximum pressure	15 bar	3 bar	
Pressure unit	MPa, kgf/cm², bar, psi	kPa, kgf/cm², bar, psi, inHg, mmHg	
Pressure resolution	-	1 kPa	
	0.001 MPa	-	
	0.01 kgf/cm²	0.001 kgf/cm²	
	0.01 bar	0.001 bar	
	0.1 psi	0.01 psi	
	-	0.01 inHg	
Repeatability	- 1 mmHg		
Repeatability	≤ ±0.2% F.S. ±1 digit		
LCD display	Red / Green main & unit display - Orange sub-display (7 segment)		
Protection class	IP40		
Temperature range	0 ÷ 50 °C		
Ambient humidity range	35 ÷ 85 %RH (No condensation)		
Voltage	12 ÷ 24 V DC (± 10%)		
Current consumption	≤ 40 mA (With no load)		
Switch output (protected from over-run)	Open collector NPN (2 outputs)		Open collector PNP (2 outputs)
	Max. load current: 125 mA		Max. load current: 125 mA
	Max. supply voltage: 30V DC		Max. supply voltage: 24V DC
	Residual voltage: ≤ 1.5V		Residual voltage: ≤ 1.5V
	Response time: ≤ 2,5 ms (chattering-proof function 25, 100, 250, 500, 1000, 1500 ms)		
Hysteresis	Adjustable (*3)		
Analog output (Voltage output)	Output current: 1 ÷ 5V ± 2,5% F.S.		
	Linearity ± 1% F.S.		
	Output impedance ≈ 1kΩ		
Ports	G1/8 - M5		
Load wire	Oil resistance cable (0,15 mm²) - Lenght 200 mm		
Weight	80 gr		

(\*1) Nominal pressure:

(\*2) Displayed pressure:

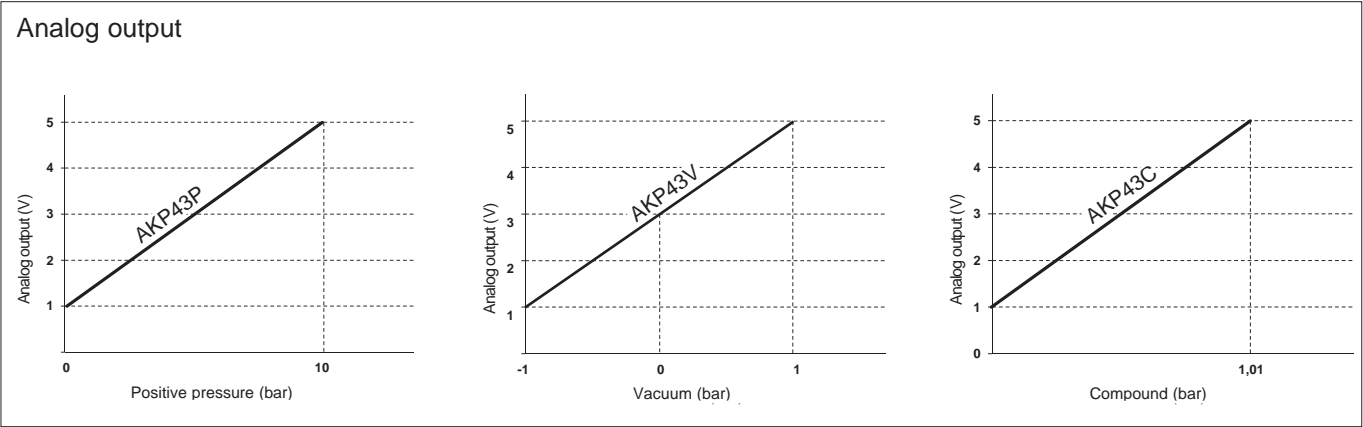
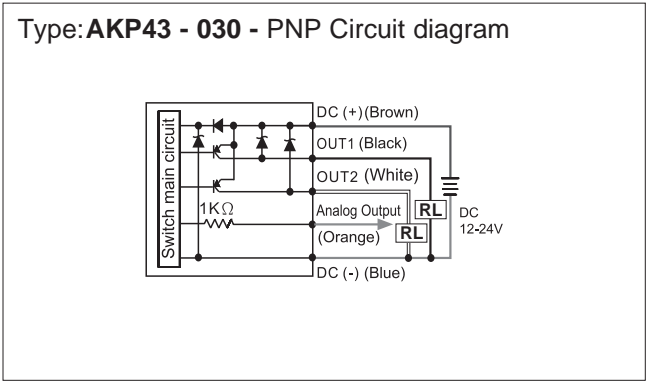
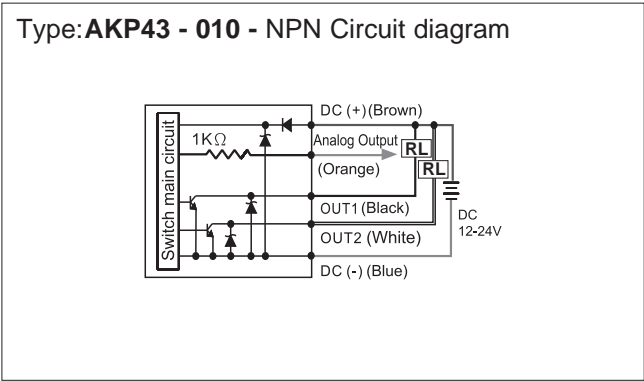
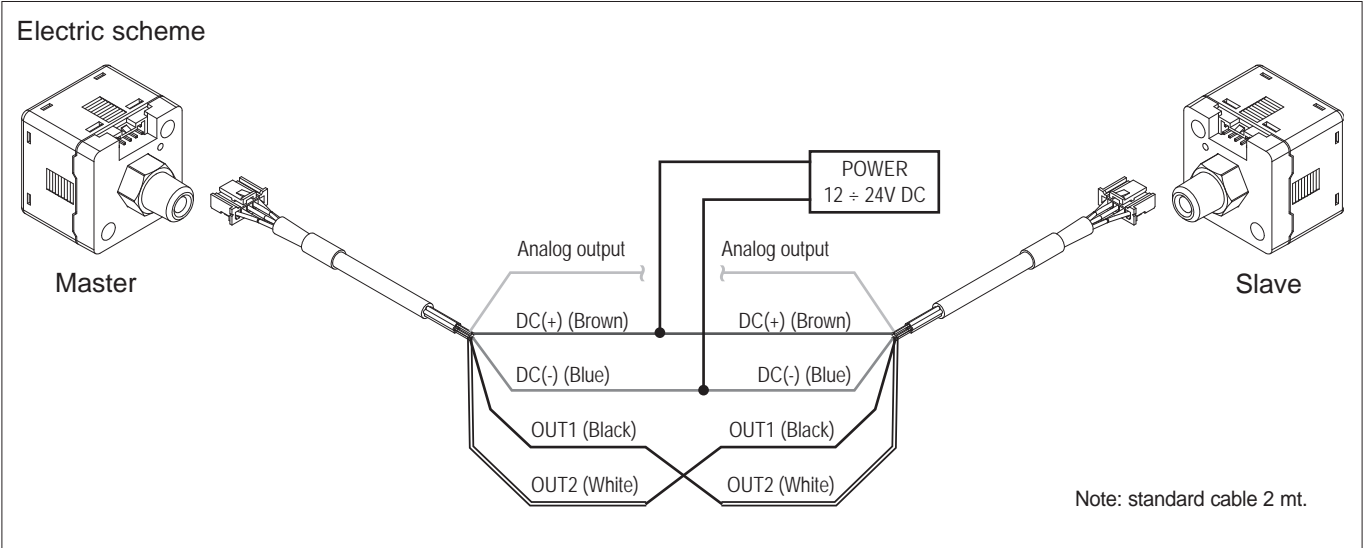
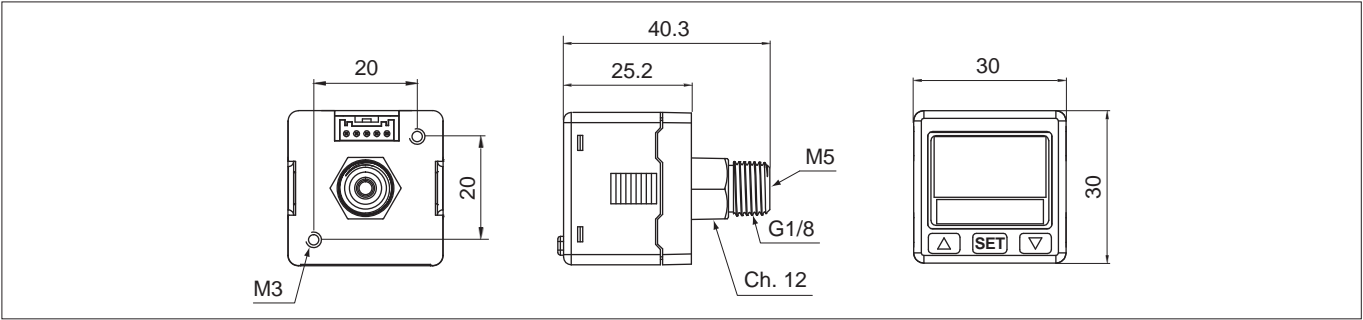
(\*3) Hysteresis:

Pressure range within which technical features of pressure/vacuum gauges are granted.

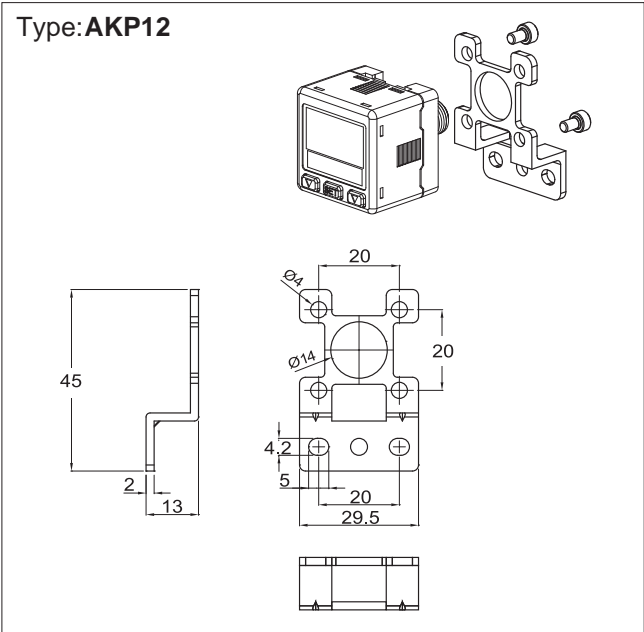
Pressure range possible to display on pressure/vacuum gauges. Pressure values displayed can also be off the nominal pressure range and in this case, technical features are not granted.

Value is adjustable within 1 ~ 8 digits.

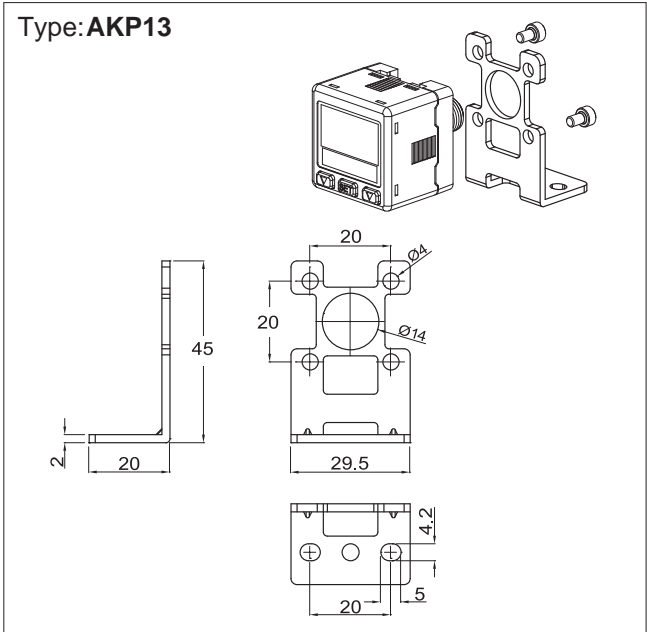




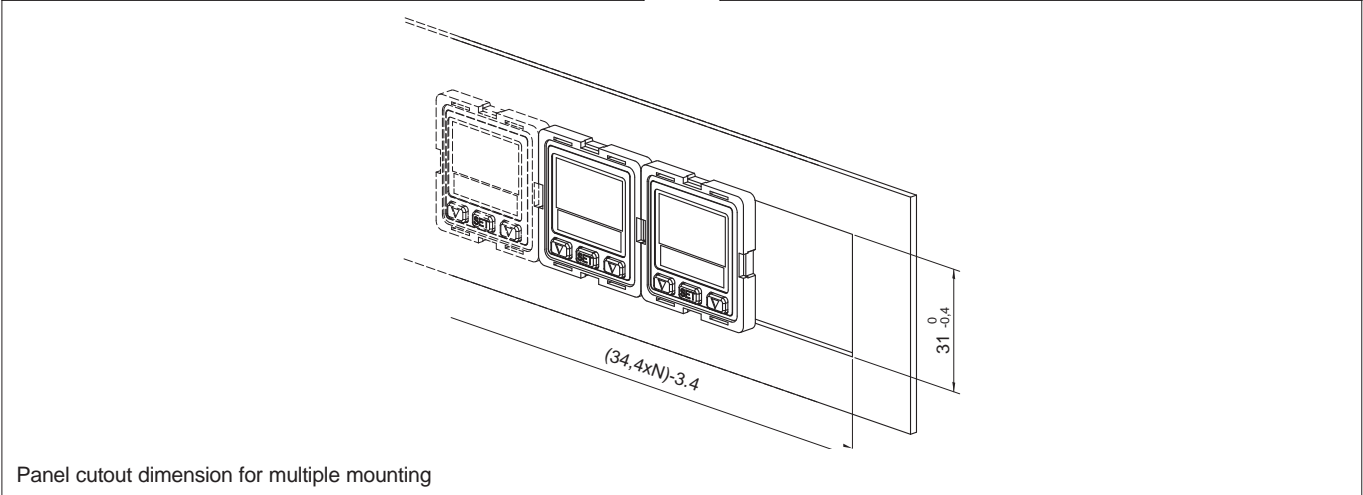
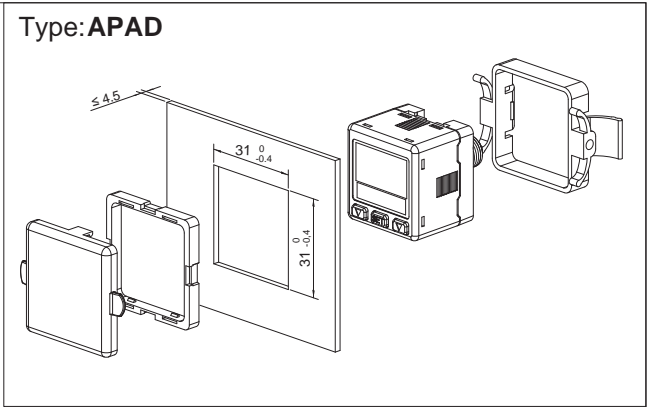
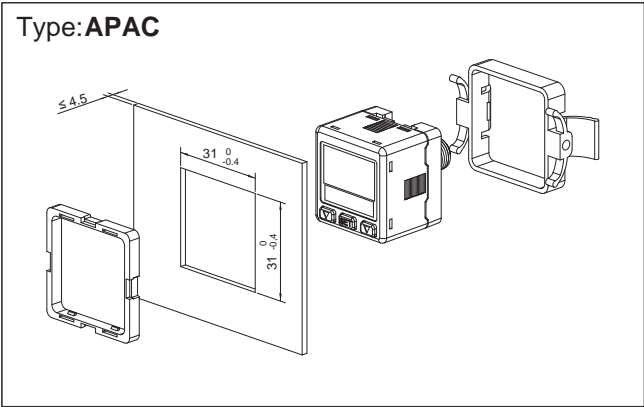
Version	Code	Item
Bracket	024816	AKP12
"L" bracket	024817	AKP13
Panel adapter	024809	APAC
Panel adapter and front protective lid	024802	APAD



The kit includes 2 screws for fixing the pressure-gauges/vacuum gauges



The kit includes 2 screws for fixing the pressure-gauges/vacuum gauges



Panel cutout dimension for multiple mounting