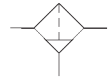




Compressed Air Preparation - vma

System description of the filter system vma G^{1/4} – G2		12
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Compressed air preparation for the most critical requirements

Cleaning of compressed air with standard filters is insufficient for many applications. For cases of this kind, the filter system V-M-A, available as single units or combinations, offers a wide range of filters to meet all requirements, from technical-clean air working equipment via process air to odour-free air for breathing. Housing assembled from **vma modular system** for direct flange mounting with sizes I and II. Two sizes of housing and 6 different sizes of filter element. Connecting threads from G^{1/4} to G2 in accordance with DIN-ISO 228. Housings and bowls are made of aluminium, plastic-coated or anodised, protected against corrosion, attractive appearance, easy to clean.

Components:

Differential gauges: Indicates the pressure drop in filters. We recommend that the filter element is changed when the pressure drop exceeds 0,6 bar (red zone). Full exploitation of service life of filter saves money-timely replacement stops wastage of energy. Gauges can be fitted as desired to be readable from front or rear (double scale).

Kit for bracket mounting of single units and combinations available as an accessory.

Filter elements: For every size of filter - three different elements of identical dimensions. See following pages for detailed description.

Condensate drain valves are available in different versions:

- **External automatic drain valve:** Standard for pre- and microfilter. Outboard, easily accessible for maintenance. Minimum operating pressure 4bar.
- **Manual drain valve:** Fitted as standard in the form of a drain screw in the case of activated charcoal-filters, since these are not subject to condensation.



Single units

Pre-filters, Micro-filters, Activated-charcoal-filters

The **structure** of the v-m-a range as regards individual sizes and connecting threads is as follows: Two different sizes of housing are available with two or four different bowl lengths, which makes a total of 6 different nominal sizes or element sizes. For each size, two different connection threads are available (even three for the smallest sizes), thus making a total of 13 different versions of each single unit or combination.

The **relationship** between filter size and connecting thread is shown in the table below:

Housing size	I				II							
Nominal size	I 1		I 2		II 1		II 2		II 3		II 4	
Connection thread	G ^{1/4}	G ^{3/8}	G ^{1/2}	G ^{3/4}	G1	G1 ^{1/4}	G1 ^{1/2}	G2				



Combinations

Pre-filter - Micro-filter

Micro-filter - Activated-charcoal-filter

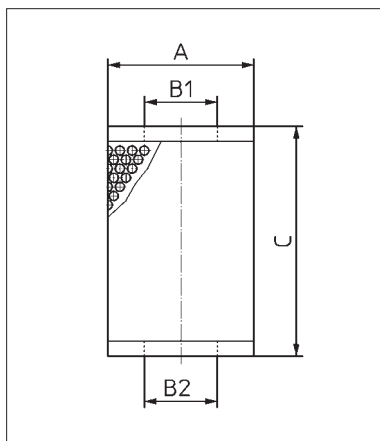
Pre-filter - Micro-filter - Activated-charcoal-filter

Combinations are assembled from single units in the case of sizes I and II by simple flangemounting, using four tapered sleeves with screws and nuts.

The working sequence for flange mounting is as follows:

1. Lay the first unit on the table, with the flange face uppermost.
2. Insert the sealing ring and four nuts into the appropriate recesses.
3. Position the next unit with its flange face downwards.
4. Fit the tapered sleeves one at a time and tighten the screws lightly.
5. Fully tighten the screws, working crosswise.

Operation: As a protection of the differential gauge the unit must be charged **slowly** with pressure after assembly, so that a pressure equalization persists.



Filter elements

v Pre-filter element - sintered Polyethylen, chiefly for filtering of solid matter.

m Micro-filter element - borosilicate glass microfiber, chiefly to remove aerosols.

a Activated-charcoal-filter element - for adsorption of oil vapours.

The service life of filters up to the recommended time for replacement (when the pressure drop reaches 0,6 bar) is about 2000 hours of operation, depending on the incidence of contamination. We recommend a flow rate of between 10% and 80% of the specified nominal values.

Dimensions

Size	I1	I2	II1	II2	II3	II4
A	48		71			
B1/B2	24/12		48/12			
C	75	145	110	210	310	500

All three filter elements within each size have identical installation dimensions (A and B1/B2).



Pre-filters (v)

Filter elements made out of sintered Polyethylen with high capacity.

Application: Prefilters for use with microfilters and combinations of microfilters/activated-charcoal-filters, and as after-filters for adsorptive, absorptive and refrigerating dryers, dust filters for compressed air and other compressed gases.

Structure: 1. Polyethylen cylinder
2. End caps aluminium

Mode of operation: As the compressed air enters the housing, the increased cross-section and the resulting reduction in velocity cause larger solid and liquid impurities to separate out and drop into the bowl. All contamination with a particle size of greater than $2\mu\text{m}$ is retained on the large-area surface of the starshaped folded filter material. The high capacity of the filter ensures a long service life.

Cleaning: Should if possible be carried out by washing the filter with a warm soap solution and blowing it out from the inside to the outside. Cleaning should be carried out at the latest when the pressure drop reaches 0,6bar, i.e. the pressure-gauge pointer enters the red zone.

Standard version:

With differential gauge and external automatic drain valve A

Size	Thread	Order No.	
		Pre-filter compl.	Element
I1	G ^{1/4} *	429.2102	429-152
	G ^{3/8} *	429.2104	429-152
	G ^{1/2} *	429.2106	429-152
I2	G ^{1/2} *	429.2206	429-156
	G ^{3/4}	429.2208	429-156
II1	G ^{3/4} *	429.2308	429-158
	G1*	429.2309	429-158
II2	G1*	429.2409	429-159
	G1 1/4*	429.2410	429-159
II3	G1 1/4*	429.2510	429-161
	G1 1/2*	429.2511	429-161
II4	G1 1/2*	429.2611	429-162
	G2	429.2612	429-162

* Inlet and outlet reduced

Order key for all variants:

429.x102

└── 2 – with differential gauge
 5 – without differential gauge

for example:

429.2102 without differential gauge = **429.5102**



2 vma

Technical data

Max. operating pressure (p ₁)	16 bar
Operating temperature	+5 °C up to +80 °C
Mounting position	vertical
Direction of flow	see arrow (from inside to outside)
Connection thread	G ^{1/4} to G2 (see table)
Min. operating pressure	
- manually operated drain valve:	from 0 bar
- external automatic drain valve A:	4 bar
Differential gauge	0 to 2 bar (0 to 29psi)
Efficiency	99,99% referred to $2\mu\text{m}$ (solid impurities)
Compressed air quality	ISO8573-1, Class 2

Dimensions

Size	Thread	Unit dimensions (mm)						Mounting			Weight (g)
		W	A	B	C	E	F	G***	J	K	
I1	G ^{1/4} *, G ^{3/8} *, G ^{1/2} *	83	335	83	57	41,5	410	40	48	M6	2100
I2	G ^{1/2} *, G ^{3/4}	83	405	83	57	41,5	550	40	48	M6	2300
II1	G ^{3/4} *, G1*	118	420	118	72	59	530	70	80	M8	4800
II2	G1*, G1 1/4*	118	520	118	72	59	730	70	80	M8	5300
II3	G1 1/4*, G1 1/2*	118	620	118	72	59	930	70	80	M8	5700
II4	G1 1/2*, G2	118	810	118	72	59	1310	70	80	M8	6400

* Inlet and outlet reduced

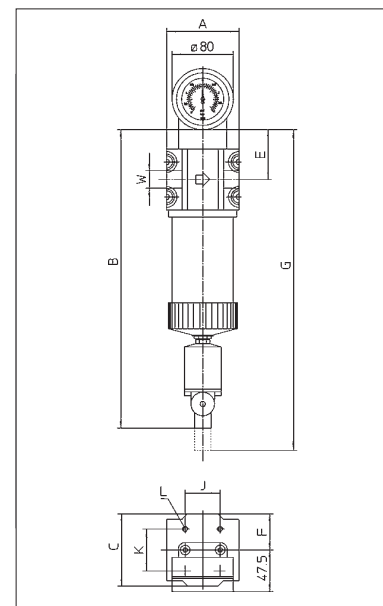
*** Space required to change element

Rates of flow

Size	Thread	Rates of flow Q**
I1	G ^{1/4} *, G ^{3/8} *, G ^{1/2} *	60 (1000)
I2	G ^{1/2} *, G ^{3/4}	120 (2000)
II1	G ^{3/4} *, G1*	180 (3000)
II2	G1*, G1 1/4*	320 (5333)
II3	G1 1/4*, G1 1/2*	500 (8333)
II4	G1 1/2*, G2	800 (13333)

* Inlet and outlet reduced

** Rates of flow in Nm³/h (NI/min) measured at p₁=6bar and Δp= 0,05 bar.



Condensate drain valves, see chapter 8



Micro-filters (m)



Borosilicate glass microfiber filters. Used mainly to filter out aerosols and solid contamination with a particle size of over 0,01 µm. We recommend that a prefilter “v” is fitted upstream.

Application: Paint-spraying, sandblasting, control systems, vacuum systems, measuring instruments, fluids, air for conveying devices, process air, aircushion bearings, air-conditioning systems.

- Structure:**
1. Inner support, perforated stainless steel.
 2. Pre-filtration mesh.
 3. Borosilicate glass microfiber material.
 4. Support fabric.
 5. Outer support, perforated stainless steel.
 6. Foam-material sheath.
 7. End caps aluminium.

Mode of operation: Air, which should if possible be pre-cleaned (pre-filter), flows through the filter element from the inside to the outside. Coarse particles are first removed by the pre-filtration mesh, and fine filtration is then provided by the multi-layer borosilicate glass microfiber material. The high void content of 94 % between the glass fibres ensures a high capacity for solid particles.

Cleaning: Is not possible. The filter elements should be replaced at the latest when the pressure drop reaches 0,6 bar, i.e. the differential pressure-gauge pointer enters the red zone respectively after about 2000 hours of operation.

Standard version:

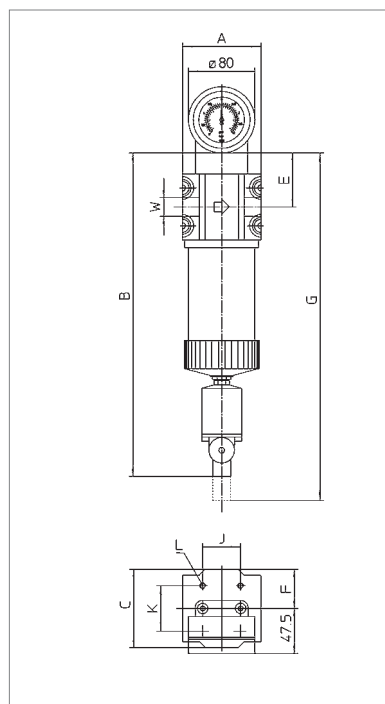
With differential gauge and external automatic drain valve A.		Order No.	
Size	Thread	Micro-filters compl.	Element
I1	G 1/4*	430.2102	430-2
	G 3/8*	430.2104	430-2
	G 1/2*	430.2106	430-2
I2	G 1/2*	430.2206	430-6
	G 3/4	430.2208	430-6
II1	G 3/4*	430.2308	430-8
	G 1*	430.2309	430-8
II2	G 1*	430.2409	430-9
	G 1 1/4*	430.2410	430-9
II3	G 1 1/4*	430.2510	430-11
	G 1 1/2*	430.2511	430-11
II4	G 1 1/2*	430.2611	430-12
	G 2	430.2612	430-12

* Inlet and outlet reduced

Order key for all variants:

430.x102
 2 – with differential gauge
 5 – without differential gauge

for example:
430.2102 without differential gauge = **430.5102**



Technical data

Max. operating pressure (p₁)	16 bar
Operating temperature	+5°C up to +80°
Mounting position	vertical
Direction of flow	see arrow (from inside to outside)
Connection thread	G 1/4 to G 2 (see table)
Min. operating pressure	
- manually operated drain valve:	from 0 bar
- external automatic drain valve A:	4 bar
Differential gauge	0 to 2 bar (0 to 29 psi)
Efficiency	99,9999% referred to 0,01 µm
Residual oil content	0,01 ppm
Compressed air quality	ISO8573-1, Dust/Oil, Class 1

Rates of flow

Size	Thread	Rates of flow
	W	Q**
I1	G 1/4*, G 3/8*, G 1/2*	78 (1300)
I2	G 1/2*, G 3/4	120 (2000)
II1	G 3/4*, G 1*	245 (4080)
II2	G 1*, G 1 1/4*	275 (4580)
II3	G 1 1/4*, G 1 1/2*	390 (6500)
II4	G 1 1/2*, G 2	540 (9000)

* Inlet and outlet reduced

** Rates of flow in Nm³/h (NI/min) measured at p₁=6bar and Δp=0,1 bar

Dimensions

Size	Thread	Unit dimensions (mm)						Mounting			Weight (g)
		W	A	B	C	E	F	G***	J	K	
I1	G 1/4*, G 3/8*, G 1/2*	83	335	83	57	41,5	410	40	48	M6	2100
I2	G 1/2*, G 3/4	83	405	83	57	41,5	550	40	48	M6	2300
II1	G 3/4*, G 1*	118	420	118	72	59	530	70	80	M8	4800
II2	G 1*, G 1 1/4*	118	520	118	72	59	730	70	80	M8	5300
II3	G 1 1/4*, G 1 1/2*	118	620	118	72	59	930	70	80	M8	5700
II4	G 1 1/2*, G 2	118	810	118	72	59	1310	70	80	M8	6400

* Inlet and outlet reduced

*** Space required to change element

Condensate drain valves, see chapter 8



Activated-charcoal-filters (a)

Activated-charcoal-filters for the adsorption of liquid vapours. We recommend that a micro-filter M is fitted upstream in all cases where dried air is not used.

Application: Food industry, packing industry, beverage industry, air for breathing, pressure chambers, medicinal technology, dental technology, measurement technology.

Structure:

1. Activated-charcoal layer.
2. Filtration layer.
3. Support sheath, perforated stainless steel.
4. End caps aluminium.

Mode of operation: The pre-cleaned compressed air (from a dryer, microfilter or microfilter with prefilter) first flows through the activated-charcoal layer. The thickness of this layer ensures a sufficient contact time for the adsorption of liquid vapours. Any carried-over activated-charcoal particles are retained in the outer filter layer. In order to ensure a long service life for the filter, the compressed air which enters the activated-charcoal filter should not contain any solid or liquid contamination.

Cleaning or regeneration is not possible. The filter elements should be replaced at the latest after about 2000 hours of operation.

Versions:

Without differential gauge, with manual drain valve		Order No.	
Size	Thread	Activated-charcoal-filters	Element
I1	G ^{1/4} *	431.6102	431-2
	G ^{3/8} *	431.6104	431-2
	G ^{1/2} *	431.6106	431-2
I2	G ^{1/2} *	431.6206	431-6
	G ^{3/4}	431.6208	431-6
II1	G ^{3/4} *	431.6308	431-8
	G1*	431.6309	431-8
II2	G1*	431.6409	431-9
	G1 ^{1/4} *	431.6410	431-9
II3	G1 ^{1/4} *	431.6510	431-11
	G1 ^{1/2} *	431.6511	431-11
II4	G1 ^{1/2} *	431.6611	431-12
	G2	431.6612	431-12

* Inlet and outlet reduced



Technical data

Max. operating pressure (p₁)	16 bar
Operating temperature	+5 °C up to +80 °C
Mounting position	vertical
Direction of flow	see arrow (from inside to outside)
Connection thread	G ^{1/4} to G2 (see table)
Residual oil content	0,005 ppm
Compressed air quality	ISO8573-1, Class 1

Dimensions

Size	Thread	Unit dimensions (mm)						Mounting			Weight (g)
		W	A	B	C	E	F	G ^{***}	J	K	
I1	G ^{1/4} *, G ^{3/8} *, G ^{1/2} *	83	245	83	57	41,5	320	40	48	M6	1890
I2	G ^{1/2} *, G ^{3/4}	83	315	83	57	41,5	460	40	48	M6	2090
II1	G ^{3/4} *, G1*	118	330	118	72	59	440	70	80	M8	4590
II2	G1*, G1 ^{1/4} *	118	430	118	72	59	640	70	80	M8	5090
II3	G1 ^{1/4} *, G1 ^{1/2} *	118	530	118	72	59	840	70	80	M8	5490
II4	G1 ^{1/2} *, G2	118	720	118	72	59	1220	70	80	M8	6190

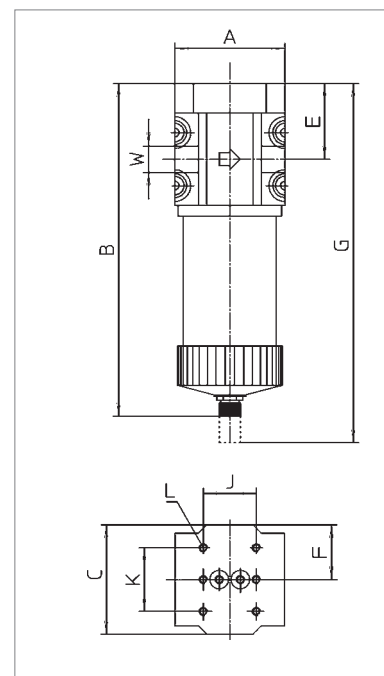
*** Space required to change element * Inlet and outlet reduced

Rates of flow

Size	Thread	Rates of flow	
		W	Q ^{**}
I1	G ^{1/4} *, G ^{3/8} *, G ^{1/2} *	30	(500)
I2	G ^{1/2} *, G ^{3/4}	60	(1000)
II1	G ^{3/4} *, G1*	90	(1500)
II2	G1*, G1 ^{1/4} *	160	(2667)
II3	G1 ^{1/4} *, G1 ^{1/2} *	250	(4167)
II4	G1 ^{1/2} *, G2	400	(6667)

* Inlet and outlet reduced

** Rates of flow in Nm³/h (NI/min)
measured at p₁=6bar and Δp=0,12bar



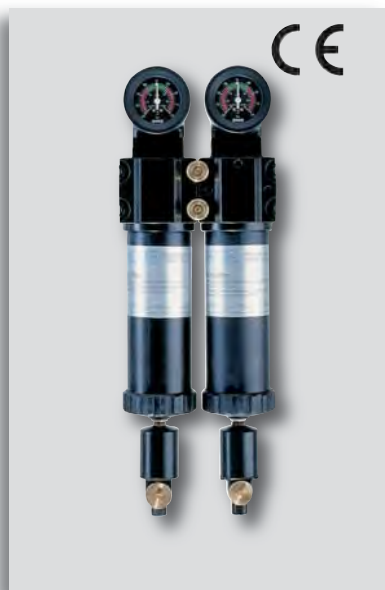
Condensate drain valves, see chapter 8



Combinations

Will be supplied as single components with connectors.

- Variants: **Pre-filter - Micro-filter (v-m)**
Micro-filter - Activated-charcoal-filter (m-a)
Pre-filter - Micro-filter - Activated-charcoal-filter (v-m-a)



Standard version: With differential gauge.

Size	Thread	Order No.		
		v-m	m-a	v-m-a
I1	G 1/4*	432.2102	433.2102	434.2102
	G 3/8*	432.2104	433.2104	434.2104
	G 1/2*	432.2106	433.2106	434.2106
I2	G 1/2*	432.2206	433.2206	434.2206
	G 3/4	432.2208	433.2208	434.2208
II1	G 3/4*	432.2308	433.2308	434.2308
	G 1*	432.2309	433.2309	434.2309
II2	G 1*	432.2409	433.2409	434.2409
	G 1 1/4*	432.2410	433.2410	434.2410
II3	G 1 1/4*	432.2510	433.2510	434.2510
	G 1 1/2*	432.2511	433.2511	434.2511
II4	G 1 1/2*	432.2611	433.2611	434.2611
	G 2	432.2612	433.2612	434.2612

* Inlet and outlet reduced

Order key for additional options:

432.x102

- 2 – with differential gauge
- 5 – without differential gauge

for example:

432.2102 without differential gauge = **432.5102**

Technical data

See single devices.

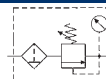
Rates of flow / Dimensions

Size	Thread	Rates of flow Q**	Installation length (A)	
			vm/ma	vma
I1	G 1/4*, G 3/8*, G 1/2*	30 (500)	166	249
I2	G 1/2*, G 3/4	60 (1000)	166	249
II1	G 3/4*, G 1*	90 (1500)	236	354
II2	G 1*, G 1 1/4*	160 (2667)	236	354
II3	G 1 1/4*, G 1 1/2*	250 (4167)	236	354
II4	G 1 1/2*, G 2	400 (6667)	236	354

* Inlet and outlet reduced

** Rates of flow in Nm³/h (NI/min) measured at p₁=6 bar and Δp=0,1 bar

Maintenance units G^{1/4}



The maintenance units G^{1/4} consists of a **combination of prefilter** and **microfilter**, inclusive automatic drain valves, supplemented by a pressure regulator and optional differential gauge. Through the installation of maintenance units in the network of air (4-16 bar) is the provision of purified and reduced air.

The pre-filter and micro-filter clean air (solid impurity 0.01 micron and 0.01 ppm residual) channeled through the pressure regulator on the distribution and pressure hoses to the respective consumers (e.g. instrument sealing air). Flow rate at 1 bar (Δp 0,2bar) 200NI/min.

Versions	Order No.
Without differential gauge with automatic drain valves, Bracket mounting inclusive, Regulator with gauge (range 0,5 - 3bar) adjusted at 1 bar.	432.017
With differential gauge for micro-filter, with automatic drain valves, Bracket mounting inclusive, Regulator with gauge (range 0,5 - 3bar) adjusted at 1 bar.	432.002



Accessories

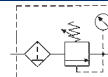
Article	Order No.	
	Size I	Size II
Connecting components (kit) for flange connection of two units. Kit consists of one sealing ring and four tapered sleeves, screws and nuts. Two kits are required for the flange connection of three units.	429-29	429-33
Bracket mounting (kit) for mounting to vertical surfaces. Consists of a mounting bracket and two screws to secure this to the unit, at the front or rear, as desired.	429-25	429-27
Special wrench (no picture) to dismantle used containers to replace the filter cartridge.	429-70	429-92
Electronic drain valve 230VAC New generation. Contactless measurement of accumulated condensate. The condensate is drained without a loss of compressed air.	5370.200	
Adapter set for mounting to condensate bowls (5370.200) (no picture) for attachment to the filter. Ø14 a- G ^{1/2} a (dimensions see chapter 8)	5370-400	



Spare parts

Article	Order No.
	Size I / Size II
Differential gauge ø80, height 97,5 mm For all filters. Two-part scale 0 to 2bar (0 to 29 psi). Green zone 0 to 0,6 bar, red zone 0,6 to 2bar. Complete with mounting components for flange mounting (2 screws, 2 seals).	5429.10
External automatic drain valve A Between 4 and 16bar. When a certain condensation level is reached, a float activates a pneumatic servo valve and the drain valve is opened. Connection G ^{1/8} .	5370.4





Filter-regulating station “microair”

Air quality according to ISO8573.1 - Class 1

Multi-stage compressed air preparation system with high-quality filter elements (pre-filter, micro-filter and, if needed, activated carbon-filter) for optimal paint results, avoiding (rendering unnecessary) costly retouching work and preventing operational failure. Removes contamination such as H₂O, CO, CO₂, hydrocarbons and dust particles. High flow-rate (3000NI/min) with differential gauge as an individual indicator of the degree of contamination. Provides optimal economic efficiency, service and safety.

Areas of application:

Sand blasting - Chemical industry - Synthetics industry - Production of paints and varnishes - Packaging industry - Technical specification subject to prior change.

Construction and components:

Stage one - Pre-filter

Finely sintered bronze filter, 5 µm filtration, for filtering solids and liquids, filtration efficiency 99%, (reusable after washing). With external automatic drain valve A.

Stage two - Pressure regulator

Independent of primary pressure with increased precision, without air consumption, regulates the desired operating pressure from 0,5 to 10 bar. Gauge with solvent resistant glass.

Stage three - Micro-filter

Multi-layered deep-bed filter with three-dimensional filtration by borosilicate fibrous web with high-capacity dirt-absorption. For fine filtration of solid particles in ressed air and oil-water aerosols up to a residual oil content of 0,01mg/m³.

Chemically and biologically inactive, water-resistant. Stainless steel protective case and aluminium cover. Filtration efficiency 99,99998% at 0,01 µm. Tested and approved according to LPV 0.700.9900 (Fraunhofer Institute).

Distribution unit

For removal of air. Available with 2 ball valves or 2 couplings.



Version	Order No.
Pre-filter – Pressure regulator – Micro-filter	
Filter regulating station with distribution block and 2 ball valves G^{3/8}	439.2
Filter regulating station with distribution block and 2 couplings DN 7,2	439.3

Bracket mounted.

Accessories

Stage four - Activated-charcoal-filter

The filter regulator can be extended with the extension set **Activated-charcoal-filter + distribution unit**. The advantage is a breathing air quality with substantially less impurity than the ambient air. The add-on pack can be attached to the double nipple 185.77 to 439.2 or 439.3.

Activated carbon filter: Multilayer activated carbon for the adsorption of gaseous fluids and hydrocarbons (oil aerosols, odors). Residual oil content of 0,005ppm. See also item description.



Article	Order No.
Activated carbon filter + distributor with 2 couplings DN 7,2 with gauge	439.4
Double nipple for mounting on 439.2 or 439.3	185.77

Spare parts



Article	Order No.
Pre-filter element	429-100
Micro-filter element	430-6
Activated-charcoal-filter element	431-6
Gauge ø 50, vertical, 0 - 16 bar (on the distribution block (without picture))	102
Gauge ø 63, horizontal, 0 - 16 bar (on the pressure regulator (without picture))	89

Technical data

Connection thread	G ^{1/2}
Max. operating pressure (p₁)	16 bar
Operating temperature	+5 °C up to +80 °C
Rates of flow	3000NI/min
Materials - seals	NBR
- housing	Al, CuZn39Pb3
- distributor, bowl	aluminum plastic coated

Subject to technical changes.