

| | |
|---------------------------|----------|
| System description | 2 |
|---------------------------|----------|

| | | |
|-------------------------|--|----------|
| Individual Units | | 3 |
|-------------------------|--|----------|

Pre-Filters

Micro-Filters

Activated-Charcoal-Filters

| | | |
|---------------------|--|----------|
| Combinations | | 6 |
|---------------------|--|----------|

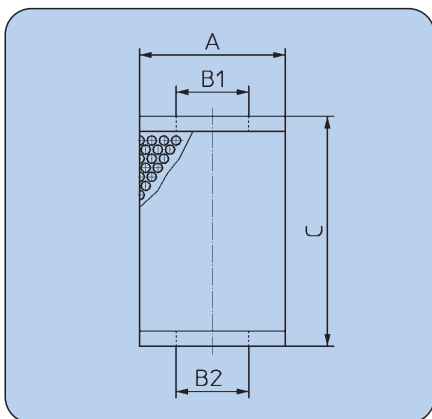
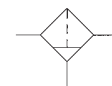
| | | |
|---|--|----------|
| Accessories and Main spare parts | | 6 |
|---|--|----------|

| | | |
|--------------------------------------|--|----------|
| Service Units G^{1/4} | Pre-Filter – Micro-Filter – Regulator | 7 |
|--------------------------------------|--|----------|

| | | |
|-----------------------------------|--|----------|
| Special Filter Combination | | 8 |
|-----------------------------------|--|----------|

| | | |
|---------------------------------|--|----------|
| microair G^{1/2} | | 8 |
|---------------------------------|--|----------|





Dimensions

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

Compressed-air treatment 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 G¹/₄ to G2 in accordance with DIN-ISO228. Housings and bowls are made of aluminium, plastic-coated or anodised, protected against corrosion, attractive appearance, easy to clean.

Differential pressure gauges. Indicates the pressure drop in filters. We recommend that the filter element is changed when the pressure drop exceeds 0,6bar (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.

Fully automatic drain valve. Fitted as standard to pre-filters and micro-filters. Mounted outboard, easily accessible for maintenance. Minimum operating pressure 4 bar.

Manually-operated 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 flange-mounting, 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 pressure gauge the unit must be charged **slowly** with pressure after assembly, so that a pressure equalization persists.

Filter elements

The three different filter elements available for each size of filter have identical dimensions:

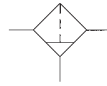
v Pre-filter element - sintered Polyethylen, chiefly for filtering of solid matter.

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

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

Since the flow direction with pre-filters and micro-filters or activated-charcoal-filters is different, attention must be paid to this when changing filter elements or reassembling filters. The service life of filters up to the recommended time for replacement (when the pressure drop reaches 0,6bar) 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.

Pre-Filter –v– vma



Filter elements made out of sintered Polyethylen with high capacity .

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

Efficiency 99,99% referred to 2µm (solid contamination)

Flow direction from inside to outside.

Structure
1. Polyethylencylinder
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 2µm 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.

Technical Data

| | |
|--|------------------------------------|
| Max. operating pressure | 16bar |
| Operating temperature | +5°C to +80°C |
| Mounting position | vertical |
| Direction of flow | arrow |
| Connection thread | G ^{1/4} to G2 (see table) |
| Minimum operating pressure (manually-operated drain valve) | up 0bar |
| (external-automatic drain valve A) | 4bar |
| Differential pressure gauge | 0 to 2bar (0 to 29psi) |
| Efficiency | 99,99% referred to 2µm |
| Compressed air quality | ISO8573-1, Class 2 |

Pre-Filters

with differential pressure gauge and add-on automatic drain valve A

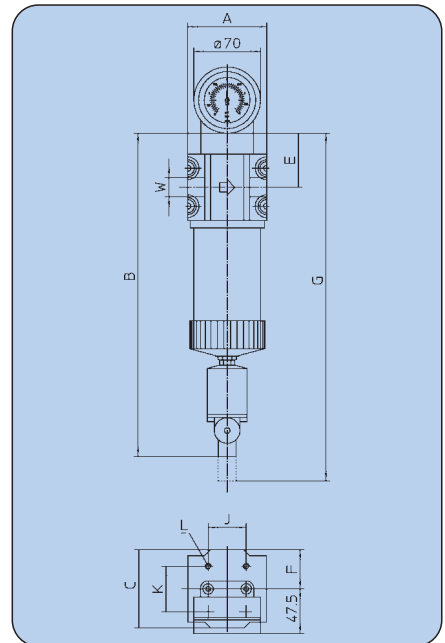
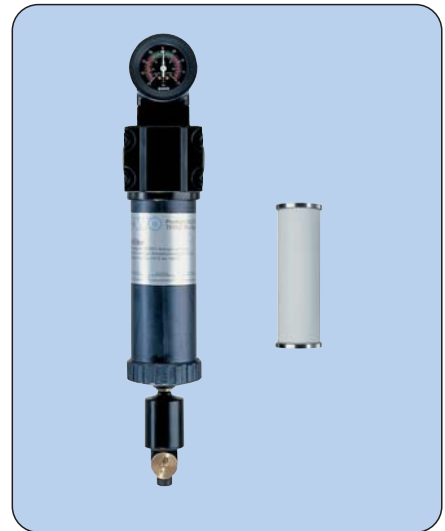
| Size | Thread | Unit | Element |
|------|---------------------|----------|---------|
| I1 | G ^{1/4} * | 429.2102 | 429-152 |
| | G ^{3/8} * | 429.2104 | 429-152 |
| | G ^{1/2} * | 429.2106 | 429-152 |
| I2 | G ^{1/2} * | 429.2206 | 429-156 |
| | G ^{3/4} | 429.2208 | 429-156 |
| II1 | G ^{3/4} * | 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 |

special option - how to order:

429.x102
 | 2 - with differential pressure gauge
 | 5 - without differential pressure gauge

For example:

429.2102 without differential pressure gauge = 429.5102



Rates of flow

| Size | Thread | W | 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) |

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

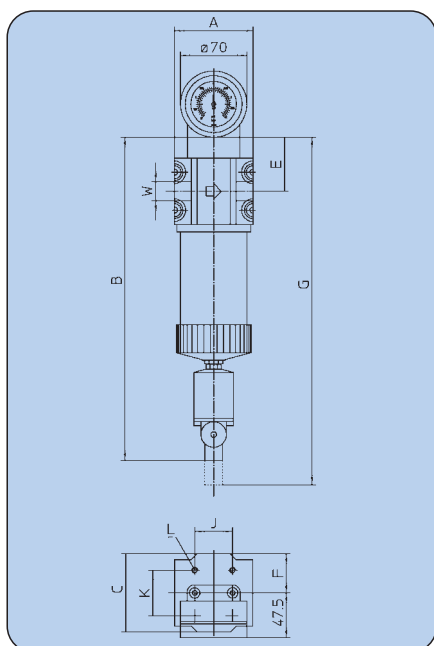
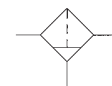
Dimensions

| Size | Thread | Unit Dimensions [mm] | | | | | | Mounting | | | Weight [g] |
|------|--|----------------------|-----|-----|----|------|------|----------|----|----|------------|
| | | A | B | C | E | F | G*** | J | K | L | |
| 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 |

***Space required to change element.

Drain valves, see individual brochures 7

* Inlet and outlet reduced



Rates of flow

| Size | Thread 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 , G1 | 245 | (4080) |
| II2 | G1, G ¹ / ₄ | 275 | (4580) |
| II3 | G ¹ / ₄ , G ¹ / ₂ | 390 | (6500) |
| II4 | G ¹ / ₂ , G2 | 540 | (9000) |

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

Dimensions

| Size | Thread W | Unit Dimensions [mm] | | | | | | Mounting | | | Weight [g] |
|------|---|----------------------|-----|-----|----|------|------|----------|----|----|---------------|
| | | A | B | C | E | F | G*** | J | K | L | |
| 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*, G ¹ / ₄ * | 118 | 520 | 118 | 72 | 59 | 730 | 70 | 80 | M8 | 5300 |
| II3 | G ¹ / ₄ *, G ¹ / ₂ * | 118 | 620 | 118 | 72 | 59 | 930 | 70 | 80 | M8 | 5700 |
| II4 | G ¹ / ₂ *, G2 | 118 | 810 | 118 | 72 | 59 | 1310 | 70 | 80 | M8 | 6400 |

***Space required to change element.

Drain valves, see individual brochures [7](#)

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

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

Efficiency 99,9999% referred to 0,01 µm. Residual oil content 0,01 ppm.

Flow direction from inside to outside.

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 0,6bar, i.e. the differential pressure-gauge pointer enters the red zone respectively after about 2000 hours of operation.

Technical Data

| | |
|------------------------------------|---|
| Max. operating pressure | 16 bar |
| Operating temperature | +5°C to +80°C |
| Mounting position | vertical |
| Direction of flow | arrow |
| Connection thread | G ¹ / ₄ to G2 (see table) |
| Minimum operating pressure | |
| (manually-operated drain valve) | up 0 bar |
| (external-automatic drain valve A) | 4 bar |
| Differential pressure 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 |

Micro-Filters with differential pressure gauge and automatic drain valve A

| Size | Thread | Unit | 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 |
| | G1* | 430.2309 | 430-8 |
| II2 | G1* | 430.2409 | 430-9 |
| | G ¹ / ₄ * | 430.2410 | 430-9 |
| II3 | G ¹ / ₄ * | 430.2510 | 430-11 |
| | G ¹ / ₂ * | 430.2511 | 430-11 |
| II4 | G ¹ / ₂ * | 430.2611 | 430-12 |
| | G2 | 430.2612 | 430-12 |

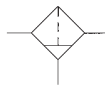
special option - how to order:

430.x102

└───┬───┘ 2 - with differential pressure gauge
 └───┘ 5 - without differential pressure gauge

For example:

430.2102 without differential pressure gauge = **430.5102**



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.

Efficiency Residual oil content 0,005 ppm.

Flow direction from inside to outside.

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, micro-filter or micro-filter with pre-filter) 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.

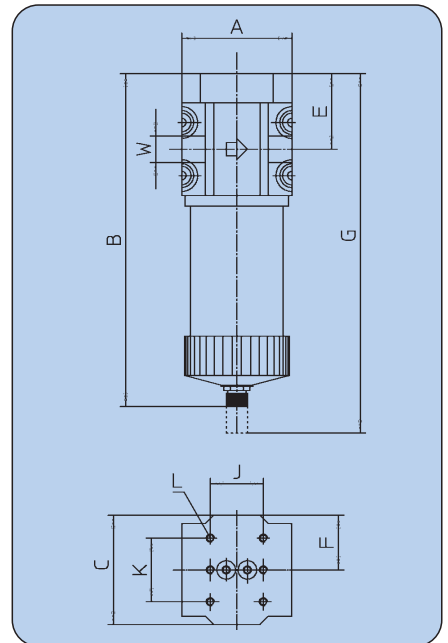
Technical Data

| | |
|------------------------------------|------------------------------------|
| Max.operating pressure | 16 bar |
| Operating temperature | +5 °C to +80 °C |
| Mounting position | vertical |
| Direction of flow | arrow |
| Connection thread | G ^{1/4} to G2 (see table) |
| Differential pressure gauge | 0 to 2 bar (0 to 29 psi) |
| Residual oil content | 0,005 ppm |
| Compressed air quality | ISO8573-1, Class 1 |

Activated-Charcoal-Filters

Without differential pressure gauge but with manually-operated drain valve

| Size | Thread | Unit | 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 |



Rates of flow

| *Size | Thread 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) |

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

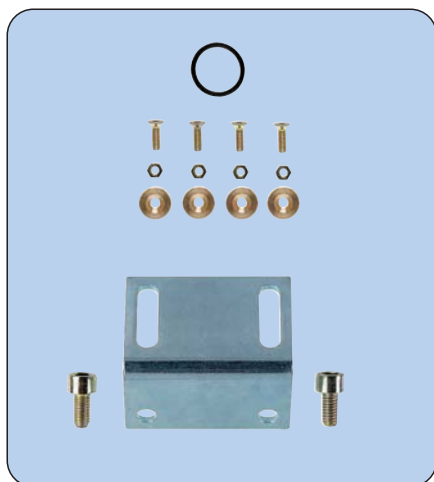
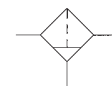
Dimensions

| Size | Thread W | Unit Dimensions [mm] | | | | | | Mounting | | | Weight [g] |
|------|--|----------------------|-----|-----|----|------|------|----------|----|----|------------|
| | | A | B | C | E | F | G*** | J | K | L | |
| 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.

Drain valves, see individual brochures **7**

* Inlet and outlet reduced



Combinations (will be supplied as single components with connectors)

Pre-filter / micro-filter (v-m)

Micro-filter / activated-charcoal-filter (m-a)

Pre-filter / micro-filter / activated-charcoal-filter (v-m-a)

| Size | Thread | v-m | m-a | v-m-a |
|------|---------|----------|----------|----------|
| I1 | G1/4* | 432.2102 | 433.2102 | 434.2102 |
| | G3/8* | 432.2104 | 433.2104 | 434.2104 |
| | G1/2* | 432.2106 | 433.2106 | 434.2106 |
| I2 | G1/2* | 432.2206 | 433.2206 | 434.2206 |
| | G3/4 | 432.2208 | 433.2208 | 434.2208 |
| II1 | G3/4* | 432.2308 | 433.2308 | 434.2308 |
| | G1* | 432.2309 | 433.2309 | 434.2309 |
| II2 | G1* | 432.2409 | 433.2409 | 434.2409 |
| | G1 1/4* | 432.2410 | 433.2410 | 434.2410 |
| II3 | G1 1/4* | 432.2510 | 433.2510 | 434.2510 |
| | G1 1/2* | 432.2511 | 433.2511 | 434.2511 |
| II4 | G1 1/2* | 432.2611 | 433.2611 | 434.2611 |
| | G2 | 432.2612 | 433.2612 | 434.2612 |

special option - how to order:

432.x102

- 2 - with differential pressure gauge
- 5 - without differential pressure gauge

For example:

432.2102 without differential pressure gauge = 432.5102

Accessories

Connectors for sizes I and II 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.

Kit for bracket mounting for mounting on vertical surfaces. Consists of a mounting bracket and two screws to secure this to the unit, at the front or rear as desired.

| | Size I | Size II |
|-------------------------|--------|---------|
| Connectors | | |
| Kit | 429-29 | 429-33 |
| Bracket mounting | | |
| Kit | 429-25 | 429-27 |
| Special wrench | 429-70 | 429-92 |

Special wrench (without picture) for dismantling the bowls.

Main spare parts

Differential pressure gauges for all filters. Two-part scale 0 to 2bar (0 to 29psi). Green zone 0 to 0,6bar, red zone 0,6 to 2bar. Complete with mounting components for flange mounting (2 screws, 2 seals).

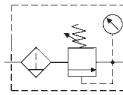
| Differential pressure gauge $\varnothing 70$ | 5429.10 | 5429.10 |
|--|---------|---------|
|--|---------|---------|

Rates of flow / Dimensions

**Rates of flow in Nm³/h (l/min) measured at p₁=6bar and $\Delta p=0,12$ bar.

| Size | Thread | Rates of flow Q** | Installation length [A] | |
|------|---------------------|----------------------|-------------------------|-------|
| | | | v-m / m-a | v-m-a |
| I1 | G1/4*, G3/8*, G1/2* | 30 (500) | 166 | 249 |
| I2 | G1/2*, G3/4 | 60 (1000) | | |
| II1 | G3/4*, G1* | 90 (1500) | 236 | 354 |
| II2 | G1*, G1 1/4* | 160 (2667) | | |
| II3 | G1 1/4*, G1 1/2* | 250 (4167) | | |
| II4 | G1 1/2*, G2 | 400 (6667) | | |

For further technical data, see individual units.



Service units

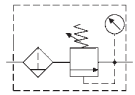
Through the installation of maintenance units in the network of air (4-16bar) is the provision of purified and reduced air.

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) is 200NI/min.

| Article | Order No |
|---|----------|
| Combination G 1/4 (Prefilter – Microfilter – Regulator) without differential pressure gauge, with automatic drain valves, Bracket mounting inclusive, Regulator with gauge (range 0,5-3bar) adjusted at 1 bar. | 432.017 |
| Combination G 1/4 (Pre – Microfilter – Regulator) with differential pressure gauge for microfilter, with automatic drain valves, Bracket mounting inclusive, Regulator with gauge (range 0,5-3bar) adjusted at 1 bar. | 432.002 |





Filter-regulating station for paint-spraying

Air quality according to ISO 8573.1 - 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 (3000 NI/min) with differential pressure gauge as an individual indicator of the degree of contamination. Provides optimal economic efficiency, service and safety.

Technical Data

| | |
|--------------------------|-----------------------------------|
| Thread | G ¹ / ₂ |
| Primary pressure | 16 bar |
| Temperature range | +5 °C bis +80 °C |
| Flow rate | 3000 NI/min |
| Washers | NBR |
| Materials | Housing Distributor, bowl |
| | Al, CuZn39Pb3 Plastic (coated) |

Additional applications:

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

Stage One - Pre-filter with Automatic Drain Valve

Finely sintered bronze filter, 5 µm filtration, for filtering solids and liquids, filtration efficiency 99%, (reusable after washing)

Stage Two - Pressure Reducer gauge with solvent resistant glass protecting panel

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

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 compressed 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 0,01µm
Tested and approved according to LPV 0.700.9900 (Fraunhofer Institute)

| Article Number | Unit |
|--|-------|
| Filter regulating station with 2 ball valves G ³ / ₈ | 439.2 |
| Filter regulating station with 2 couplings DN7,2 | 439.3 |
| Bracket mounted | |

Supplementary element: activated carbon filter + distributor block with two outlets can be connected to 439.2 and to 439.3 with double nipple 185.77.

Stage Four - activated carbon filter

Breathing-air quality with significantly less contamination than the surrounding air.

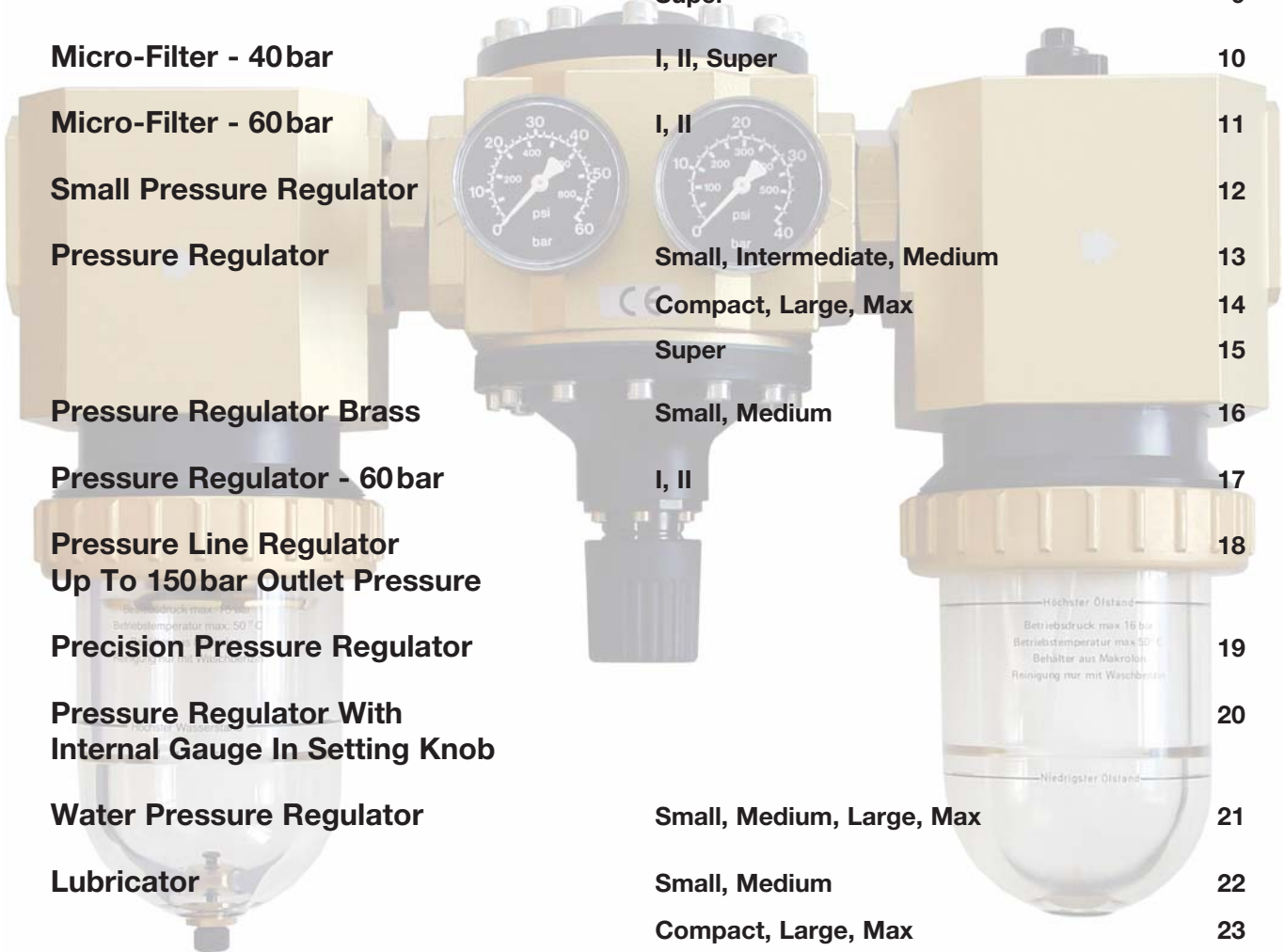
Multi-layered activated carbon for the absorption of vaporized liquids and hydrocarbons (oil-aerosols, odours). Residual oil content 0,005 ppm.

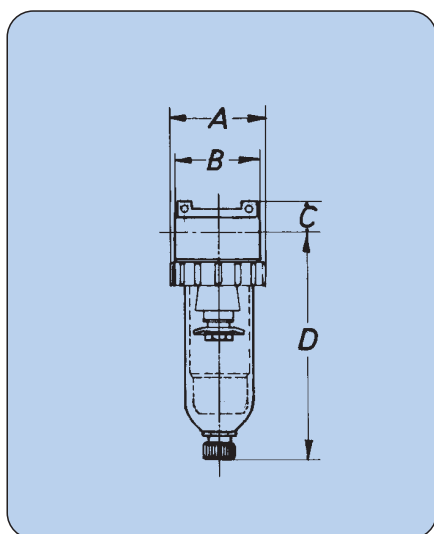
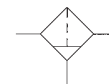
| | |
|--|-------|
| Activated carbon filter + distributor with 2 couplings DN7,2 | 439.4 |
|--|-------|

Main spare parts

| | |
|--|---------|
| Pre-filter element | 429-100 |
| Micro-filter element | 430-6 |
| Activated-charcoal-filter element | 431-6 |
| Pressure gauge ø 50 vertical, 0 - 16 bar | 102 |
| Pressure gauge ø 63 horizontal, 0 - 16 bar | 89 |

| | | |
|---|------------------------------------|-----------|
| Filter | Small, Medium | 2 |
| | Compact, Large, Max | 3 |
| | Super | 4 |
| Filter - 40 bar | I, II, Super | 5 |
| Filter - 60 bar | I, II | 6 |
| Micro-Filter | Small | 7 |
| | Medium, Large | 8 |
| | Super | 9 |
| Micro-Filter - 40 bar | I, II, Super | 10 |
| Micro-Filter - 60 bar | I, II | 11 |
| Small Pressure Regulator | | 12 |
| Pressure Regulator | Small, Intermediate, Medium | 13 |
| | Compact, Large, Max | 14 |
| | Super | 15 |
| Pressure Regulator Brass | Small, Medium | 16 |
| Pressure Regulator - 60 bar | I, II | 17 |
| Pressure Line Regulator Up To 150bar Outlet Pressure | | 18 |
| Precision Pressure Regulator | | 19 |
| Pressure Regulator With Internal Gauge In Setting Knob | | 20 |
| Water Pressure Regulator | Small, Medium, Large, Max | 21 |
| Lubricator | Small, Medium | 22 |
| | Compact, Large, Max | 23 |
| | Super | 24 |
| Small Lubricator For Air Pressure Tools | | 25 |
| Filter Pressure Regulator | Small, Medium | 26 |
| Two-Piece Maintenance Unit | Small, Medium | 27 |
| Three-Piece Maintenance Unit | Small, Medium | 28 |
| | Compact, Large, Max | 29 |
| | Super | 30 |





Dimensions [mm]

| Size Port | Small G 1/8*, G 1/4*, G 3/8 | | | Medium G 3/8* G 1/2 | |
|-----------|--------------------------------|-----|-----|------------------------|-----|
| | A | 56 | 56 | 56 | 87 |
| B | 57 | 57 | 50 | 88 | 80 |
| C | 19 | 19 | 19 | 24 | 24 |
| D** | 135 | 135 | 135 | 172 | 172 |

** -semi-automatic drain valve +10mm
-external-automatic drain valve +90mm

special option - how to order:

322.21 x

└─ M - metal bowl
└─ S - bowl protection

For example:

322.21 with bowl protection = 322.21S

Compressed air filters serve to remove impurities (condensation water, pipe scaling, rust particles) from the air in the work place. The cleansing is done in two stages by means of cycloning (condensation) and sintering filters (solid contamination). Port sizes G 1/8 to G 1/2.

Technical Data

| | Small | Medium |
|---|--------------------|-----------------------------|
| Nominal rates of flow** | 1.050NI/min | 4.670NI/min |
| Max. operating pressure plastic bowl / metal bowl | | 16bar/25bar |
| Operating temperature plastic bowl / metal bowl | | 0°C to +50°C / 0°C to +90°C |
| Effective bowl volume | 25 cm ³ | 80 cm ³ |
| Mounting position | | vertical arrow |
| Direction of flow | | |
| Nominal width | DN6 | DN15 |
| Nominal pressure (housing) | PN25 | PN25 |
| Weight | 390g | 950g |
| Material | | |
| Seals | | NBR |
| Housing | | zinc alloy |
| Filter element | | sintered bronze |
| Plastic bowl | | polycarbonate |

** measured at p₁ = 6bar and Δp = 1 bar

Filters

| Size | G 1/8 | G 1/4 | G 3/8 | G 1/2 |
|------|-------|-------|-------|-------|
|------|-------|-------|-------|-------|

with plastic bowl and manually-operated drain valve

| | | | | |
|--------|---------|---------|---------|--------|
| Small | 322.21* | 322.22* | 322.23 | - |
| Medium | - | - | 322.35* | 322.36 |

with plastic bowl and semi-automatic drain valve

| | | | | |
|--------|----------|----------|----------|---------|
| Small | 322.521* | 322.522* | 322.523 | - |
| Medium | - | - | 322.535* | 322.536 |

with plastic bowl and external-automatic drain valve A (max. 16bar)

| | | | | |
|--------|---------|---------|---------|--------|
| Small | 370.21* | 370.22* | 370.23 | - |
| Medium | - | - | 370.35* | 370.36 |

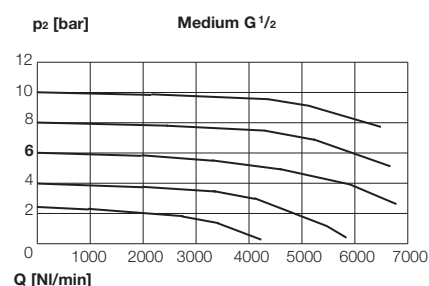
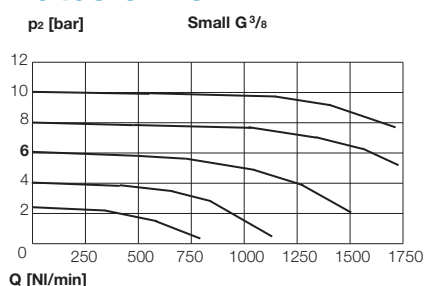
Accessories

| | Small | Medium |
|--|---------|---------|
| Bracket mounting | 322-24 | 322-25 |
| Bowl protection for plastic bowl with bowl ring | 322-130 | 322-131 |
| Metal bowl with seal and manually-operated drain valve | 324-101 | 324-109 |
| semi-automatic drain valve | 324-113 | 324-117 |
| external-automatic drain valve A | 324-114 | 324-118 |
| Bowl ring | 287-25 | 297-2 |

Main spare parts

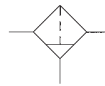
| | Small | Medium |
|--|---------|---------|
| Plastic bowl with seal and manually-operated drain valve | 322-112 | 322-118 |
| semi-automatic drain valve | 322-113 | 322-119 |
| external-automatic drain valve A | 322-114 | 322-120 |
| Bowl ring | 287-25 | 297-2 |
| Sealing ring for all bowls | 287-6 | 297-10 |
| Filter element 40 μm (mounted) | 287-10 | 267-37 |
| 5 μm | 287-13 | 298-9 |

Rates of flow



Drain valves, see chapter 7

Filter standard



Compressed air filters serve to remove impurities (condensation water, pipe scaling, rust particles) from the air in the work place. The cleansing is done in two stages by means of cycloning (condensation) and sintering filters (solid contamination). Port sizes G^{3/4} to G1^{1/2}.

| Technical Data | Compact | Large | Max |
|----------------------------|-----------------------------|--------------------|--------------------|
| Nominal rates of flow** | 6.700 NI/min | 10.000 NI/min | 12.500 NI/min |
| Max. operating pressure | 16bar/25bar | | |
| plastic bowl / metal bowl | | | |
| Operating temperature | 0°C to +50°C / 0°C to +90°C | | |
| plastic bowl / metal bowl | | | |
| Effective bowl volume | 80cm ³ | 260cm ³ | 260cm ³ |
| Mounting position | vertical | | |
| Direction of flow | arrow | | |
| Nominal width | DN20 | DN20 | DN25 |
| Nominal pressure (housing) | PN25 | | |
| Weight | 1320g | 1870g | 2120g |
| Material | | | |
| Seals | NBR | | |
| Housing | zinc alloy | alu alloy | aluminum |
| Filter element | sintered bronze | | |
| Plastic bowl | polycarbonate | | |

** measured at p₁ = 6bar and Δp = 1 bar

Filters

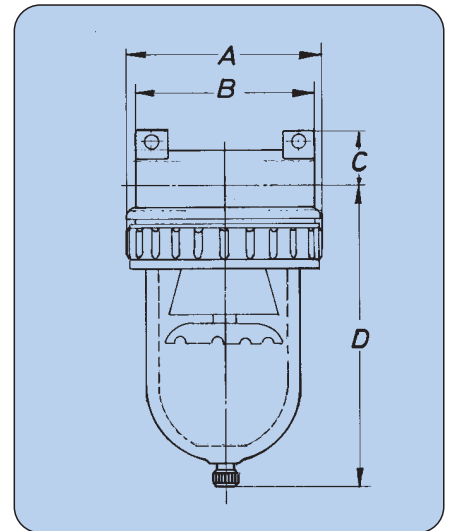
| Size | G ^{3/4} | G1 | G1 ^{1/4} | G1 ^{1/2} |
|--|------------------|---------|-------------------|-------------------|
| with plastic bowl and manually-operated drain valve | | | | |
| Compact | 405.38* | 405.39 | - | - |
| Large | 322.48* | 322.49 | - | - |
| Max | - | - | 322.410* | 322.411 |
| with plastic bowl and semi-automatic drain valve | | | | |
| Compact | 405.538* | 405.539 | - | - |
| Large | 322.548* | 322.549 | - | - |
| Max | - | - | 322.5410* | 322.5411 |
| with plastic bowl and external-automatic drain valve A (max. 16bar) | | | | |
| Compact | 370.38* | 370.39 | - | - |
| Large | 370.48* | 370.49 | - | - |
| Max | - | - | 370.410* | 370.411 |

Accessories

| | Compact | Large | Max |
|--|---------|---------|---------|
| Bracket mounting | 405-4 | 281-26 | 281-26 |
| Bowl protection for plastic bowl | | | |
| bowl protection | 322-131 | 281-24 | 281-24 |
| Bowl ring | - | 300-31 | 300-31 |
| Metal bowl with seal and manually-operated drain valve | 324-109 | 322-125 | 322-125 |
| semi-automatic drain valve | 324-117 | 322-126 | 322-126 |
| external-automatic drain valve A | 324-118 | 322-127 | 322-127 |
| Bowl ring | 297-2 | 279-2 | 279-2 |

Main spare parts

| | Compact | Large | Max |
|--|---------|---------|---------|
| Plastic bowl with seal and manually-operated drain valve | 322-118 | 322-122 | 322-122 |
| semi-automatic drain valve | 322-119 | 322-123 | 322-123 |
| external-automatic drain valve A | 322-120 | 322-124 | 322-124 |
| Bowl ring | 297-2 | 279-2 | 279-2 |
| Sealing ring for all bowls | 297-10 | 279-9 | 279-9 |
| Filter element 40µm (mounted) | 267-37 | 281-14 | 281-14 |
| 5µm | 298-9 | - | - |



Dimensions [mm]

| Size Port | Compact G ^{3/4} *, G1 | Large G ^{3/4} *, G1 | Max G1 ^{1/4} *, G1 ^{1/2} |
|-----------|--------------------------------|------------------------------|--|
| A | 102 90 | 133 133 | 133 133 |
| B | 102 90 | 134 120 | 134 120 |
| C | 38 38 | 36 36 | 46 46 |
| D** | 175 175 | 206 206 | 216 216 |

** -semi-automatic drain valve +10mm
-external-automatic drain valve +90mm

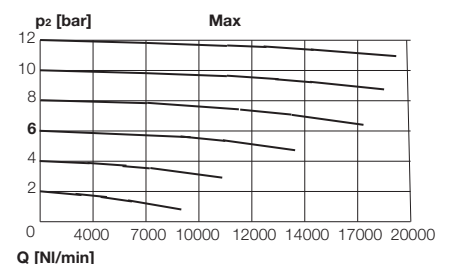
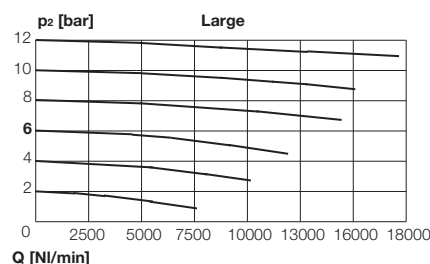
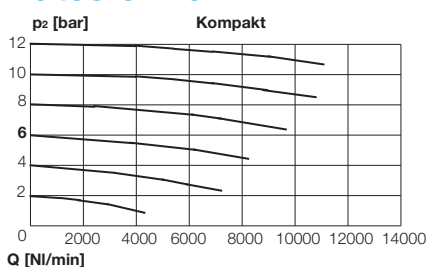
special option - how to order:

405.38 x M - metal bowl
S - bowl protection

For example:

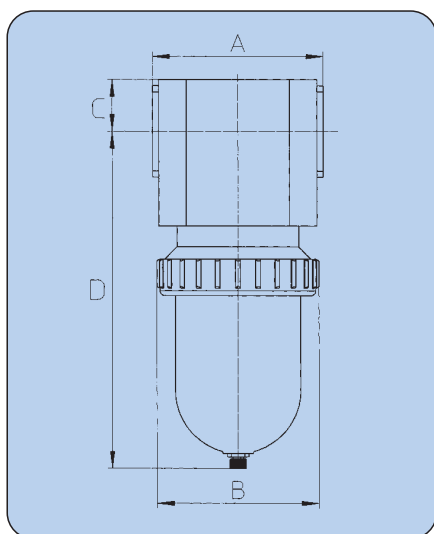
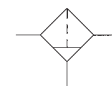
405.38 with bowl protection = 405.38S

Rates of flow



Drain valves, see chapter 7

* Inlet and outlet reduced



Dimensions [mm]

| Size Port | G 1 ¹ / ₂ * Super | G2 |
|-----------|---|------|
| A | 160 | 140 |
| B | 140 | 140 |
| C | 42,5 | 42,5 |
| D** | 330 | 330 |

** -semi-automatic drain valve +10mm
-external-automatic drain valve +90mm

special option - how to order:

456.212 x

└─ M - metal bowl
└─ S - bowl protection

For example:

456.212 with metal bowl = 456.212M

Compressed air filters serve to remove impurities (condensation water, pipe scaling, rust particles) from the air in the work place. The cleansing is done in two stages by means of cycloning (condensation) and sintering filters (solid contamination). Port sizes G 1¹/₂ to G2.

Technical Data

| | |
|---|---------------------------------|
| Nominal rates of flow** | Super 15830 NI/min |
| Max. operating pressure plastic bowl / metal bowl | 16 bar / 25 bar |
| Operating temperature plastic bowl / metal bowl | 0 °C to +50 °C / 0 °C to +90 °C |
| Effective bowl volume | 500 cm ³ |
| Mounting position | vertical |
| Direction of flow | arrow |
| Nominal width | DN50 |
| Nominal pressure (housing) | PN25 |
| Weight | 5340 g |
| Material | |
| Seals | NBR |
| Housing | aluminum |
| Filter element | sintered bronze |
| Plastic bowl | polycarbonate |

** measured at p₁ = 6 bar and Δp = 0,5 bar

Filters

| Size | G 1 ¹ / ₂ | G2 |
|---|---------------------------------|---------|
| with plastic bowl and manually-operated drain valve | | |
| Super | 456.211* | 456.212 |
| with plastic bowl and semi-automatic drain valve | | |
| Super | 456.511* | 456.512 |
| with plastic bowl and external-automatic drain valve A (max. 16 bar) | | |
| Super | 456.611* | 456.612 |

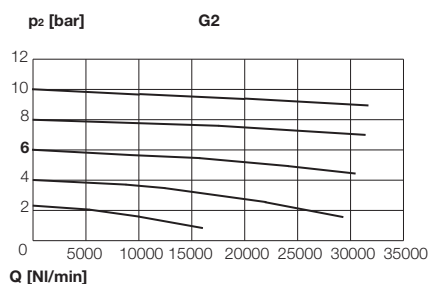
Accessories

| | Super |
|---|---------|
| Bracket mounting | 457-12 |
| Bowl protection for plastic bowl | |
| bowl protection | 281-24 |
| Bowl ring | 300-31 |
| Metal bowl with seal and | |
| manually-operated drain valve | 322-125 |
| semi-automatic drain valve | 322-126 |
| external-automatic drain valve A | 322-127 |
| Bowl ring | 279-2 |

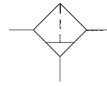
Main spare parts

| | Super |
|-----------------------------------|---------|
| Plastic bowl with seal and | |
| manually-operated drain valve | 322-122 |
| semi-automatic drain valve | 322-123 |
| external-automatic drain valve A | 322-124 |
| Bowl ring | 279-2 |
| Sealing ring | |
| for all bowls | 279-9 |
| Filter element | |
| 40µm (mounted) | 454-3 |
| 5µm | 454-11 |

Rates of flow



40bar Filter standard



Compressed air filters in modular design with condensation drain, manually operated***. Filter element of sintered bronze. Body of aluminium (black anodized). Bowl of brass. Test certificate for pressure bowl included.

Technical Data

| | I | II | Super |
|--------------------------------|-------------------|--------------------|--------------------|
| Nominal rates of flow** | 2660 NI/min | 6000 NI/min | 15830 NI/min |
| Max. operating pressure | | 40bar (PN40) | |
| Operating temperature | | 0°C to +90°C | |
| Effective bowl volume | 80cm ³ | 100cm ³ | 300cm ³ |
| Mounting position | | vertical | |
| Direction of flow | | arrow | |
| Nominal width | DN15 | DN20 | DN50 |
| Weight | 1220g | 2000g | 5800g |
| Material | | | |
| Seals | | NBR | |
| Housing | | aluminium | |
| Metal bowl | | brass | aluminum |
| Filter element | | sintered bronze | |

** measured at p₁ = 6bar and Δp = 0,2bar

40bar Filters

| Size | G ^{3/8} | G ^{1/2} | G ^{3/4} | G1 | G1 ^{1/2} | G2 |
|-------|------------------|------------------|------------------|---------|-------------------|---------|
| I | 445.015* | 445.016 | - | - | - | - II |
| II | - | - | 445.008* | 445.009 | - | - |
| Super | - | - | - | - | 454.411* | 454.412 |

Accessories

| | I | II | Super |
|-------------------------------------|--------|--------|--------|
| Bracket mounting for housing | 445-39 | 445-28 | 429-27 |

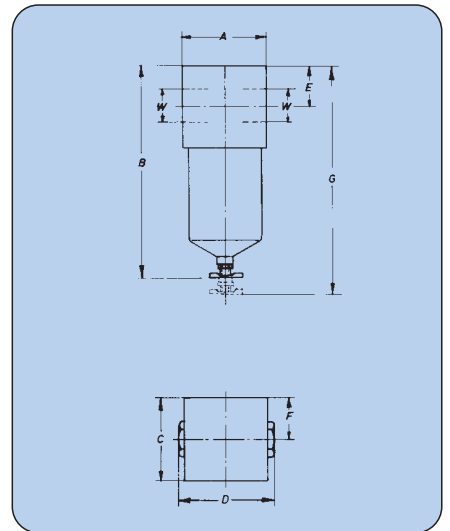
Main spare parts

| | I | II | Super |
|---|-----------|-----------|-----------|
| Filter elements | | | |
| 40 µm (mounted) | 394-16 | 267-37 | 454-3 |
| 5 µm | 394-37 | 298-9 | 454-11 |
| Manual drain valve for metal bowls | 275-41*** | 275-41*** | 275-41*** |

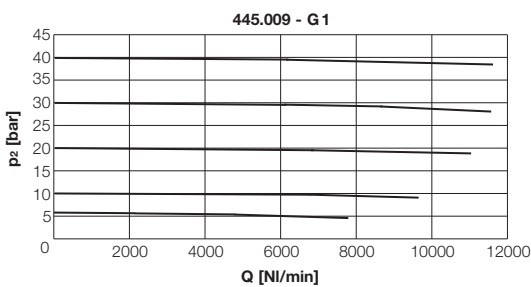
*** Condensate drain under pressure only to 25bar range



445.016



Rates of flow

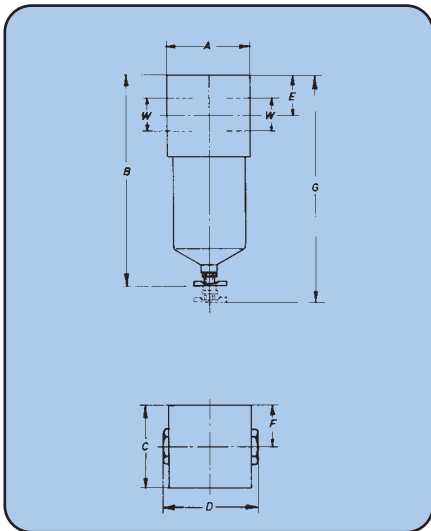
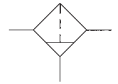


Dimensions [mm]

| Size Port | I G ^{3/8} *, G ^{1/2} | II G ^{3/4} *, G1 | Super G1 ^{1/2} *, G2 |
|-----------|---|------------------------------|----------------------------------|
| A | 65 | 80 | 140 |
| B | 200 | 210 | 285 |
| C | 65 | 80 | 120 |
| D | 70 62 | 92 80 | 160 140 |
| E | 32 | 40 | 42,5 |
| F | 31 | 40 | 70 |
| G** | 250 | 285 | 350 |

**Space required to change element.

* Inlet and outlet reduced



Dimensions [mm]

| Size Port | I | | II | |
|-----------|--------------------|------------------|--------------------|----------------|
| | G ^{3/8} * | G ^{1/2} | G ^{3/4} * | G ¹ |
| A | 65 | | 80 | |
| B | 185 | | 200 | |
| C | 65 | | 80 | |
| D | 70 | 65 | 92 | 80 |
| E | 25 | | 30 | |
| F | 33 | | 40 | |
| G** | 205 | | 285 | |

**Space required to change element.

Compressed air filters in modular design with condensation drain, manually operated. Filter element of sintered bronze. Body of aluminium (black anodized). Bowl of brass. Test certificate for pressure bowl included.

Technical Data

| | I | II |
|-------------------------|--------------------|---------------------|
| Nominal rates of flow** | 2660NI/min | 6000NI/min |
| Max. operating pressure | 60 bar (PN60) | |
| Operating temperature | 0°C to +90°C | |
| Effective bowl volume | 80 cm ³ | 100 cm ³ |
| Mounting position | vertical | |
| Direction of flow | arrow | |
| Nominal width | DN15 | DN20 |
| Weight | 1400g | 3000g |
| Material | | |
| Seals | NBR | |
| Housing | aluminum | |
| Metal bowl | brass | |
| Filter element | sintered bronze | |

** measured at p₁ = 6 bar and Δp = 0,2 bar

60 bar Filters

| Size | G ^{3/8} | G ^{1/2} | G ^{3/4} | G ¹ |
|------|------------------|------------------|------------------|----------------|
| I | 475.015* | 475.016 | - | - |
| II | - | - | 475.008* | 475.009 |

Accessories

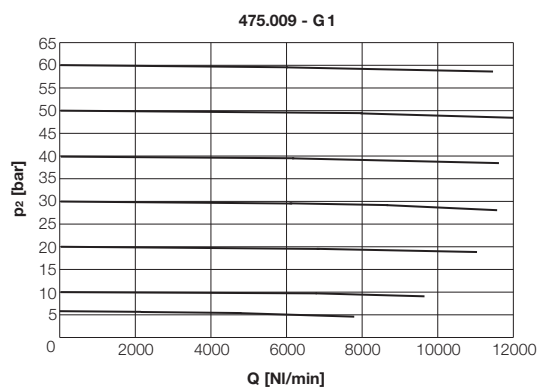
| | I | II |
|------------------------------|--------|--------|
| Bracket mounting for housing | 445-39 | 445-28 |

Main spare parts

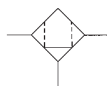
| | I | II |
|-----------------------------------|-----------|-----------|
| Filter element | | |
| 40 μm (mounted) | 394-16 | 267-37 |
| 5 μm | 394-37 | 298-9 |
| Manual drain valve for metal bowl | 275-41*** | 275-41*** |

*** Condensate drain under pressure only to 25 bar range

Rates of flow



Micro-Filter standard



Microborosilicate air filters are suitable for use in all situations in which the required purity of the compressed air is especially high. As the second stage after the standard filter they remove almost without residue the smallest remaining particles of water, oil or dirt to 99,9999% (for 0,01 µm). Residual oil content 0,01 ppm. Port size G^{1/8} to G^{3/8}.

Technical Data

| | Small |
|-----------------------------------|-------------------------------|
| Nominal rates of flow** | 560 NI/min |
| Max. operating pressure | 16bar/25bar |
| plastic bowl / metal bowl | |
| Operating temperature | 0°C to +50°C / 0°C to +90°C |
| plastic bowl / metal bowl | max. to Microfilterelement |
| Effective bowl volume | vertical |
| Mounting position | arrow |
| Direction of flow | DN6 |
| Nominal width | PN25 |
| Nominal pressure (housing) | 380g |
| Weight | |
| Material | |
| Seals | NBR |
| Housing | zinc alloy |
| Filter element | borosilicate glass microfiber |
| Plastic bowl | polycarbonate |

** measured at p₁ = 6bar and Δp = 0,2bar

Micro-Filters

| Size | G ^{1/8} | G ^{1/4} | G ^{3/8} |
|--|------------------|------------------|------------------|
| with plastic bowl and manually-operated drain valve | | | |
| Small | 403.21* | 403.22* | 403.23 |
| with plastic bowl and semi-automatic drain valve | | | |
| Small | 403.521* | 403.522* | 403.523 |
| with plastic bowl and add-on automatic drain valve A (max. 16bar) | | | |
| Small | 403.121* | 403.122* | 403.123 |

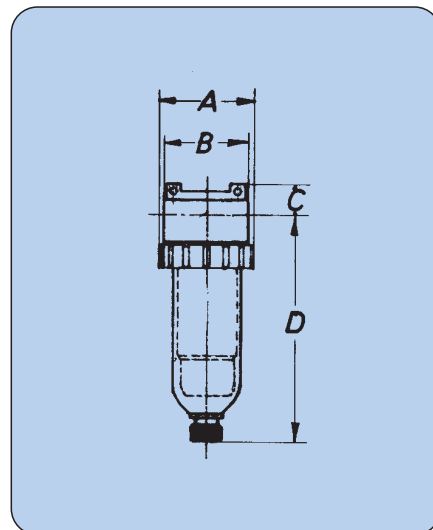
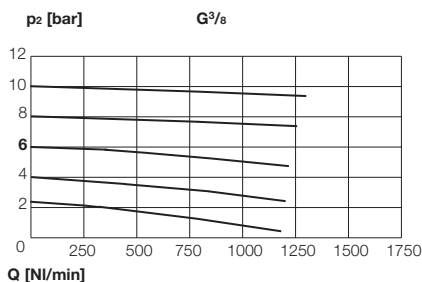
Accessories

| | Small |
|--|---------|
| Bracket mounting | 322-24 |
| Bowl protection for plastic bowl with bowl ring | 322-130 |
| Metal bowl with seal and manually-operated drain valve | 324-101 |
| semi-automatic drain valve | 324-113 |
| external-automatic drain valve A | 324-114 |
| Bowl ring | 287-25 |

Main spare parts

| | Small |
|--|--------|
| Plastic bowl with seal and manually-operated drain valve | 403-9 |
| semi-automatic drain valve | 403-26 |
| external-automatic drain valve A | 403-30 |
| Bowl ring | 287-25 |
| Sealing ring for all bowls | 287-6 |
| Micro-Filter element with seal 0,01 µm (M10x1 – ø28x68) | 403-1 |

Rates of flow



Dimensions [mm]

| Size Port | G ^{1/8} * | Small G ^{1/4} * | G ^{3/8} |
|-----------|--------------------|--------------------------|------------------|
| A | 56 | 56 | 56 |
| B | 57 | 57 | 50 |
| C | 19 | 19 | 19 |
| D** | 135 | 135 | 135 |

** -semi-automatic drain valve +10mm
-external-automatic drain valve +90mm

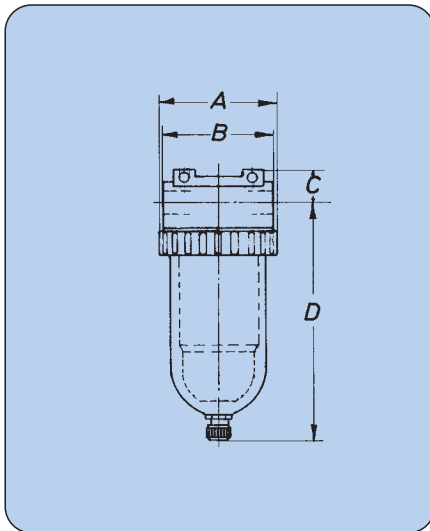
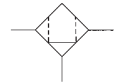
special option - how to order:

403.21 x
 M - metal bowl
 S - bowl protection

For example:

403.21- with bowl protection = 403.21S

Micro-Filter standard



Dimensions [mm]

| Size Port | Medium | | Large | |
|-----------|--------------------|------------------|--------------------|----------------|
| | G ^{3/8} * | G ^{1/2} | G ^{3/4} * | G ¹ |
| A | 87 | 87 | 133 | 133 |
| B | 88 | 80 | 134 | 120 |
| C | 24 | 24 | 36 | 36 |
| D** | 172 | 172 | 206 | 206 |

** -semi-automatic drain valve +10mm
-external-automatic drain valve +90mm

special option - how to order:

403.35 x

└─ M – metal bowl
└─ S – bowl protection

For example:

403.35- with bowl protection = 403.35S

Microborosilicate air filters are suitable for use in all situations in which the required purity of the compressed air is especially high. As the second stage after the standard filter they remove almost without residue the smallest remaining particles of water, oil or dirt to 99,9999% (for 0,01 µm). Residual oil content 0,01 ppm. Port size G^{3/8} to G¹.

Technical Data

| | Medium | Large |
|---|-------------------------------|-------------|
| Nominal rates of flow** | 2000 NI/min | 4000 NI/min |
| Max. operating pressure plastic bowl / metal bowl | 16bar/25bar | |
| Operating temperature plastic bowl / metal bowl | 0°C to +50°C / 0°C to +90°C | |
| Effective bowl volume | max. to Microfilterelement | |
| Mounting position | vertical | |
| Direction of flow | arrow | |
| Nominal width | DN15 | DN20 |
| Nominal pressure (housing) | PN25 | PN25 |
| Weight | 980g | 1900g |
| Material | | NBR |
| Seals | | NBR |
| Housing | zinc alloy | aluminum |
| Filter element | borosilicate glass microfiber | |
| Plastic bowl | polycarbonate | |

** measured at p₁ = 6bar and Δp = 0,2bar

Micro-Filters

| Size | G ^{3/8} | G ^{1/2} | G ^{3/4} | G ¹ |
|--|------------------|------------------|------------------|----------------|
| with plastic bowl and manually-operated drain valve | | | | |
| Medium | 403.35* | 403.36 | - | - |
| Large | - | - | 403.48* | 403.49 |
| with plastic bowl and semi-automatic drain valve | | | | |
| Medium | 403.535* | 403.536 | - | - |
| Large | - | - | 403.548* | 403.549 |
| with plastic bowl and external-automatic drain valve A (max. 16bar) | | | | |
| Medium | 403.135* | 403.136 | - | - |
| Large | - | - | 403.148* | 403.149 |

Accessories

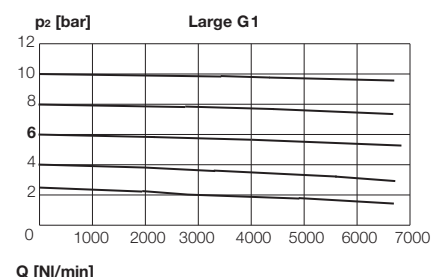
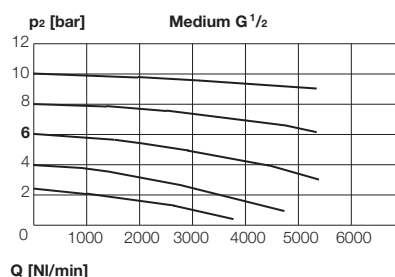
| | Medium | Large |
|---|---------|---------|
| Bracket mounting | 322-25 | 281-26 |
| Bowl protection for plastic bowl | | |
| bowl protection | 298-8 | 281-24 |
| Bowl ring | 297-13 | 300-31 |
| Metal bowl with seal and manually-operated drain valve | 324-109 | 322-125 |
| semi-automatic drain valve | 324-117 | 322-126 |
| external-automatic drain valve A | 324-118 | 322-127 |
| Bowl ring | 297-2 | 279-2 |

Main spare parts

| | Medium | Large |
|---|--------|----------|
| Plastic bowl with seal and manually-operated drain valve | 360-12 | 360-25** |
| semi-automatic drain valve | 403-28 | 403-29** |
| external-automatic drain valve A | 403-32 | 403-33** |
| Bowl ring | 297-2 | 279-2 |
| Sealing ring for all bowls | 297-10 | 279-9 |
| Filter element with seal | | |
| 0,01 µm (M23 x 1 – ø50 x 98) | 403-3 | - |
| 0,01 µm (M35 x 1,5 – ø75 x 125) | - | 403-4 |

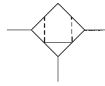
** without seal

Rates of flow



Drain valves, see chapter 7

Micro-Filter standard



Microborosilicate air filters are suitable for use in all situations in which the required purity of the compressed air is especially high. As the second stage after the standard filter they remove almost without residue the smallest remaining particles of water, oil or dirt to 99,9999% (for 0,01 µm). Residual oil content 0,01 ppm. Port size G 1 1/2 to G 2.

Technical Data

| | Super |
|---|---|
| Nominal rates of flow** | 7000NI/min |
| Max. operating pressure plastic bowl / metal bowl | 16bar/25bar |
| Operating temperature plastic bowl / metal bowl | 0°C to +50°C / 0°C to +90°C max. to Microfilterelement |
| Effective bowl volume | vertical |
| Mounting position | arrow |
| Direction of flow | DN50 |
| Nominal width | PN25 |
| Nominal pressure (housing) | 5400g |
| Weight | NBR |
| Material Seals | aluminum |
| Housing | borosilicate glass microfiber |
| Filter element | polycarbonate |
| Plastic bowl | |

** measured at p₁ = 6bar and Δp = 0,2bar

Micro-Filters

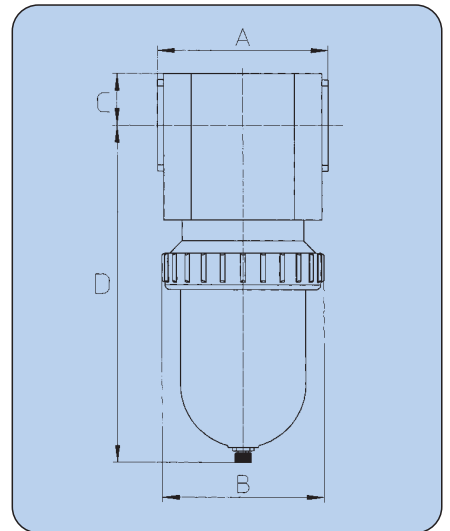
| Size | G 1 1/2 | G 2 |
|--|------------------|-----------------|
| with plastic bowl and manually-operated drain valve | | |
| Super | 403.511* | 403.512 |
| with plastic bowl and semi-automatic drain valve | | |
| Super | 403.5511* | 403.5512 |
| with plastic bowl and external-automatic drain valve A (max. 16bar) | | |
| Super | 403.1511* | 403.1512 |

Accessories

| | Super |
|---|----------------|
| Bracket mounting | 457-12 |
| Bowl protection for plastic bowl | |
| bowl protection | 281-24 |
| Bowl ring | 300-31 |
| Metal bowl with seal and manually-operated drain valve | 322-125 |
| semi-automatic drain valve | 322-126 |
| external-automatic drain valve A | 322-127 |
| Bowl ring | 279-2 |

Main spare parts

| | Super |
|---|----------------|
| Plastic bowl with seal and manually-operated drain valve | 322-122 |
| semi-automatic drain valve | 322-123 |
| external-automatic drain valve A | 322-124 |
| Bowl ring | 279-2 |
| Sealing ring for all bowls | 279-9 |
| Filter element with seal 0,01 µm (ø63x115) | 454-17 |



Dimensions [mm]

| BG | G 1 1/2* | Super | G 2 |
|-----|----------|-------|-----|
| A | 140 | 140 | 140 |
| B | 133 | 133 | 133 |
| C | 42 | 42 | 42 |
| D** | 330 | 330 | 330 |

** - semi-automatic drain valve +10mm
- external-automatic drain valve +90mm

special option - how to order:

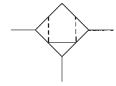
403.512 x

┌───┐ M - metal bowl
└───┘ S - bowl protection

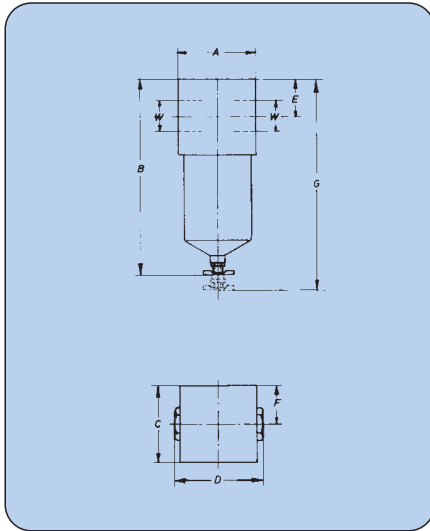
for example:

403.512 with metal bowl = 403.512 M

* Inlet and outlet reduced



445.116



Compressed air filters in modular design with condensation drain, manually operated. Filter element of Borosilicate microfiber fleece. Body of aluminium (black anodized). Bowl of brass. Test certificate for pressure bowl included. Micro-filters guarantee as the second stage best possible quality with an effectiveness of 99,9999% based on 0,01 µm. Residual oil content 0,01 ppm. The filter element with a pore size lower than 0,01 µm are of borosilicate filter with supporting casing made of stainless steel (V2A) and foamed plastic cover. Flow passes from inside to outside. Replacement after 6 months.

Technical Data

| | I | II | Super |
|--------------------------------|------------|-------------------------------|------------|
| Nominal rates of flow** | 2000NI/min | 3000NI/min | 7000NI/min |
| Max. operating pressure | | 40 bar (PN40) | |
| Operating temperature | | 0°C to +90°C | |
| Effective bowl volume | | max. to Microfilterelement | |
| Mounting position | | vertical | |
| Direction of flow | | arrow | |
| Nominal width | DN15 | DN20 | DN50 |
| Weight | 1220g | 2000g | 5800g |
| Material | | | |
| Seals | | NBR | |
| Housing | | aluminum | |
| Metal bowl | | brass | aluminum |
| Filter element | | borosilicate glass microfiber | |

** measured at $p_1 = 6\text{ bar}$ and $\Delta p = 0,2\text{ bar}$

40bar Micro-Filters

| Size | G ^{3/8} | G ^{1/2} | G ^{3/4} | G1 | G1 ^{1/2} | G2 |
|-------|------------------|------------------|------------------|---------|-------------------|---------|
| I | 445.115* | 445.116 | - | - | - | - II |
| II | - | - | 445.108* | 445.109 | - | - |
| Super | - | - | - | - | 454.511* | 454.512 |

Accessories

| | I | II | Super |
|-------------------------------------|--------|--------|--------|
| Bracket mounting for housing | 445-39 | 445-28 | 429-27 |

Main spare parts

| | I | II | Super |
|---|-----------|-----------|-----------|
| Filter elements | | | |
| 0,01 µm | 448-8 | 403-3 | 454-17 |
| Manual drain valve for metal bowls | 275-41*** | 275-41*** | 275-41*** |

*** Condensate drain under pressure only to 25 bar range

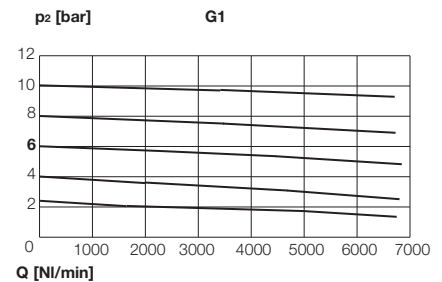
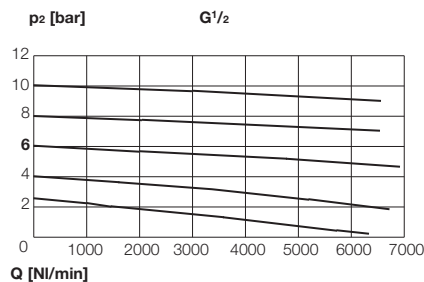
For maximum working life we recommend using a normal filter 40bar as first stage.

Dimensions [mm]

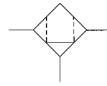
| Size Port | I G ^{3/8} *, G ^{1/2} | II G ^{3/4} *, G1 | Super G1 ^{1/2} *, G2 |
|-----------|---|------------------------------|----------------------------------|
| A | 65 | 80 | 140 |
| B | 200 | 210 | 285 |
| C | 65 | 80 | 120 |
| D | 70 65 | 92 80 | 160 140 |
| E | 32 | 40 | 42,5 |
| F | 31 | 40 | 70 |
| G** | 250 | 285 | 350 |

**Space required to change element.

Rates of flow



60bar Micro-Filter standard

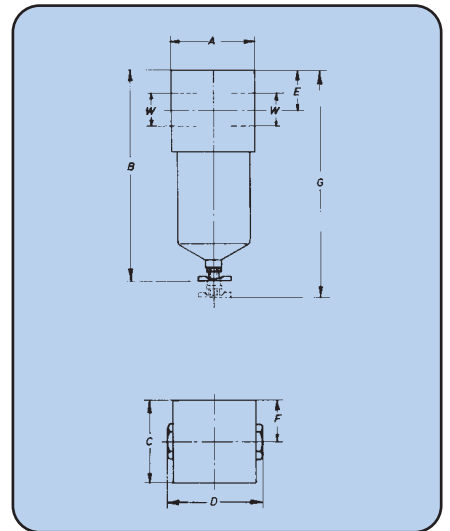


Compressed air filters in modular design with condensation drain, manually operated. Filter element of Borosilicate microfiber fleece. Body of aluminium (black anodized). Bowl of brass. Test certificate for pressure bowl included. Micro-filters guarantee as the second stage best possible quality with an effectiveness of 99,9999% based on 0,01 µm. Residual oil content 0,01 ppm. The filter element with a pore size lower than 0,01 µm are of borosilicate filter with supporting casing made of stainless steel (V2A) and foamed plastic cover. Flow passes from inside to outside. Replacement after 6 months.

Technical Data

| | I | II |
|-------------------------|-------------------------------|------------|
| Nominal rates of flow** | 2000NI/min | 3000NI/min |
| Max. operating pressure | 60bar (PN60) | |
| Operating temperature | 0°C to +90°C | |
| Effective bowl volume | max. to Microfilterelement | |
| Mounting position | vertical | |
| Direction of flow | arrow | |
| Nominal width | DN15 | DN20 |
| Weight | 1400g | 3000g |
| Material | | |
| Seals | NBR | |
| Housing | aluminum | |
| Metal bowl | brass | |
| Filter element | borosilicate glass microfiber | |

** measured at p₁ = 6bar and Δp = 0,2bar



60bar Micro-Filters

| Size | G ^{3/8} | G ^{1/2} | G ^{3/4} | G1 |
|------|------------------|------------------|------------------|---------|
| I | 475.115* | 475.116 | - | - |
| II | - | - | 475.108* | 475.109 |

Accessories

| | I | II |
|------------------------------|--------|--------|
| Bracket mounting for housing | 445-39 | 445-28 |

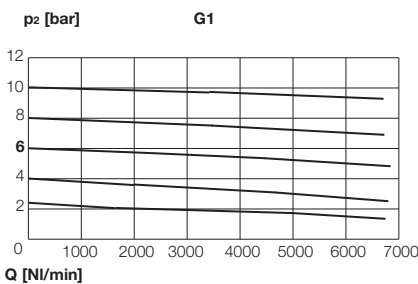
Main spare parts

| | I | II |
|-------------------------------------|-----------|-----------|
| Filter element with seal 0,01 µm | 448-8 | 403-3 |
| Manual drain valve for metal bowl | 275-41*** | 275-41*** |

*** Condensate drain under pressure only to 25bar range

For maximum working life we recommend using a normal filter 60bar as first stage.

Rates of flow



Dimensions [mm]

| BG | I G ^{3/8} *, G ^{1/2} | II G ^{3/4} *, G1 |
|-----|--|---------------------------------|
| A | 65 | 80 |
| B | 185 | 200 |
| C | 65 | 80 |
| D | 70 65 | 92 80 |
| E | 25 | 30 |
| F | 33 | 40 |
| G** | 205 | 285 |

**Space required to change element.