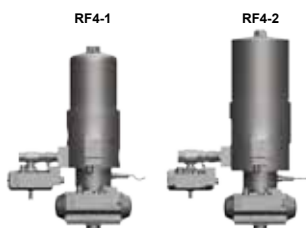


HYDAC INTERNATIONAL**Backflushing Filter
AutoFilt® RF4****1. TECHNICAL
SPECIFICATIONS****1.1 GENERAL**

The automatic backflushing AutoFilt® RF4 is a selfcleaning system for extracting particles from low viscosity fluids. Its robust construction and automatic backflushing capability make a major contribution to operational reliability and **reduce operating and maintenance costs.**

The slotted tube or SuperMesh elements in the filter with **filtration rates from 25 to 1000 µm** ensure highly effective filtration of contaminating particles from the process medium.

Automatic or manual cleaning starts as soon as the elements become contaminated.

The flow of filtrate is not interrupted during the backflushing procedure.

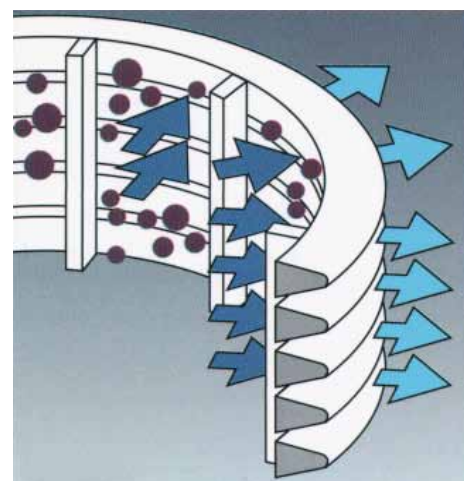
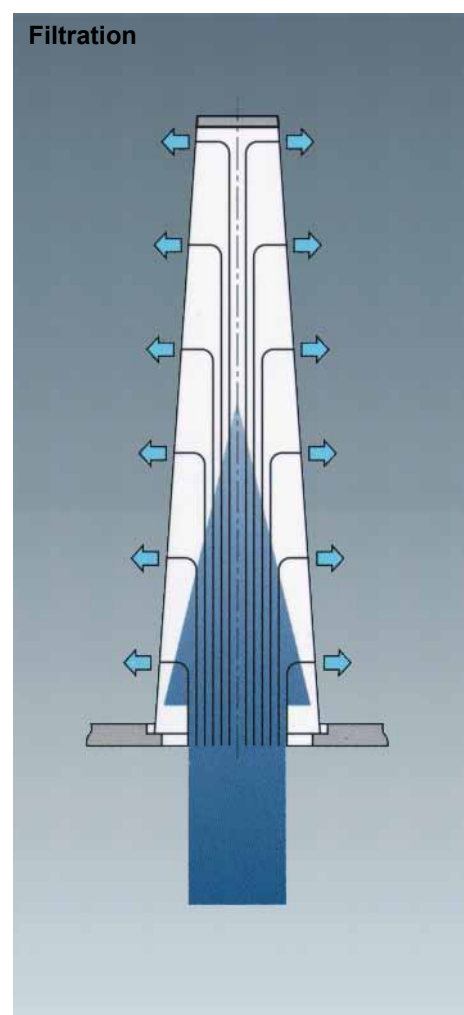
Two sizes allow **flow rates of 40 l/min to 220 l/min.**

The AutoFilt® RF4 is available as a fully automatic or purely manual version.

Numerous combinations of materials and equipment as well as **individually adjustable control parameters** allow optimum adaptation of the filter to any application.

**1.2 OPERATION OF THE
AUTOFILT® RF4
Filtration**

The fluid to be filtered flows through the slotted tube filter elements of the backflushing filter, passing from the inside to the outside. Contamination particles then collect on the smooth inside of the filter elements. As the level of contamination increases, the differential pressure between the contaminated and clean sides of the filter increases. When the differential pressure reaches its pre set value, backflushing starts automatically.

Filtration

Triggering automatic backflushing

Backflushing is triggered automatically when the triggering differential pressure is exceeded.

As soon as backflushing has been triggered, the filter starts to clean the filter elements.

Triggering backflushing on manual version

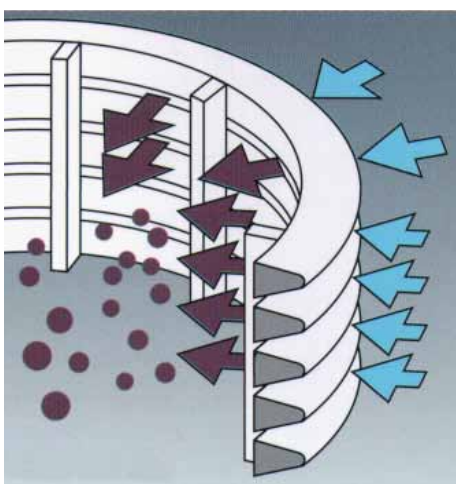
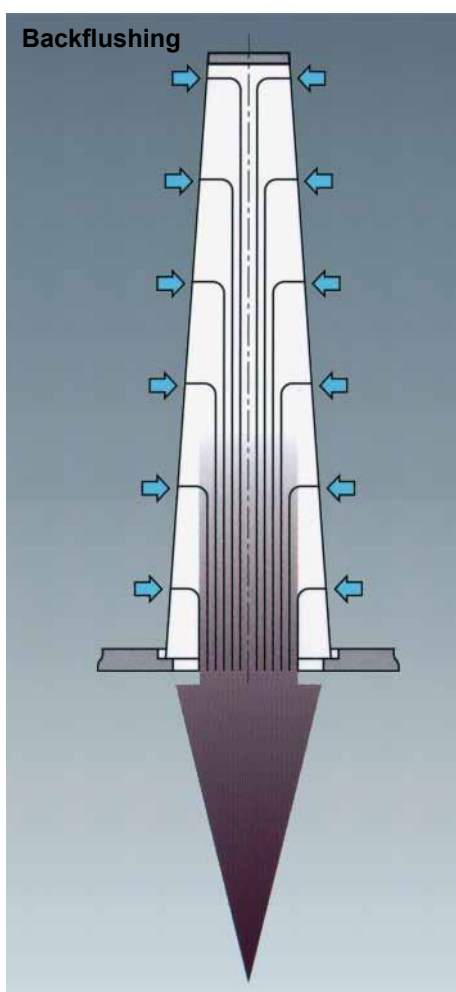
As soon as the visual clogging indicator responds, backflushing is started manually.

Backflushing of the filter elements - backflushing cycle

- The turning drive turns the element plate through an angle of 90°. This brings a clean filter element into filtration, and a contaminated filter element is positioned over the fixed flushing connection.
- The backflushing valve is opened.
- The pressure drop between the filtrate side and the backflushing line rinses a small partial flow of the filtrate in the opposite direction into the filter elements to be cleaned. The contamination particles deposited on the inside of the filter elements are detached and carried out via the rinsing arm into the backflushing line.
- After the "backflushing time per element", the backflushing valve is closed. In this way, all the filter elements are backflushed, one after the other.

A backflushing cycle is complete once all filter elements have been cleaned.

On the AutoFilt® RF4 with manual backflushing, the element plate including filter elements is turned and the backflushing valve is opened by hand.

**1.3 SPECIAL FEATURES OF THE AUTOFILT® RF4****Isokinetic filtering and backflushing**

The special conical shape and configuration of the filter elements allows even flow, resulting in low pressure drops and complete cleaning of the elements. The advantage: fewer backflushing cycles and reduced loss of backflushing fluid.

Pulse aided backflushing

The filter element to be backflushed remains in the flushing position for only a few seconds. Rapid opening of the backflushing valve generates a pressure surge in the filter element openings, providing an additional cleaning effect to the backflushing process.

Low backflushing quantities due to cyclic control

The backflushing valve opens and closes during backflushing of each filter element.

2. FILTER SPECIFICATIONS

2.1. STANDARD CONFIGURATIONS

2.1.1 Control parameters

- EPT: electro-pneumatic cyclic control
- ET: electrical cyclic control (electric only)
- M: manual

2.1.2 Connection voltages

- 230 V AC main voltage
- 230 V AC or 24 V DC control voltage
- Only for ET control versions:
 - Control voltage 24 V DC, drive 3 x 400 V/N/PE, 50 Hz

2.1.3 Housing materials (combinations)

- Aluminium, anodised
- Stainless steel
- Carbon steel, nickel-plated

2.1.4 Material of internal parts

- Stainless steel

2.1.5 Material of elements

- Stainless steel

2.1.6 Backflushing valve

- Coaxial valve
- Stainless steel ball valve
- Ball valve, nickel-plated brass

2.1.7 Differential pressure monitoring

- Differential pressure switch with or without adjustment option

2.1.8 Filtration ratings

- 25 µm, 40 µm and 60 µm SuperMesh
- 30 µm to 1000 µm slotted tube

2.1.9 Electrical protection class

- IP54

2.1.10 Pressure ranges

- 6 bar (only stainless steel designs)
- 16 bar

2.2. OPTIONAL VERSIONS

There are a range of optional versions available for the AutoFilt® RF4. For technical details and prices, please contact our Technical Sales Department at Head Office.

2.2.1 Control /electrical components / voltage supply

- Special voltages
- Customised special solutions

2.2.2 Pressure ranges

- 25 bar

2.2.3 Filter elements

- Superflush element technology
- Elements with magnetic filtration technology

2.2.4 Documentation

- Manufacturer's test certificates
 - Material certificates 3.1 according to DIN EN 10204
- And many others available on request
- Further optional models on request.

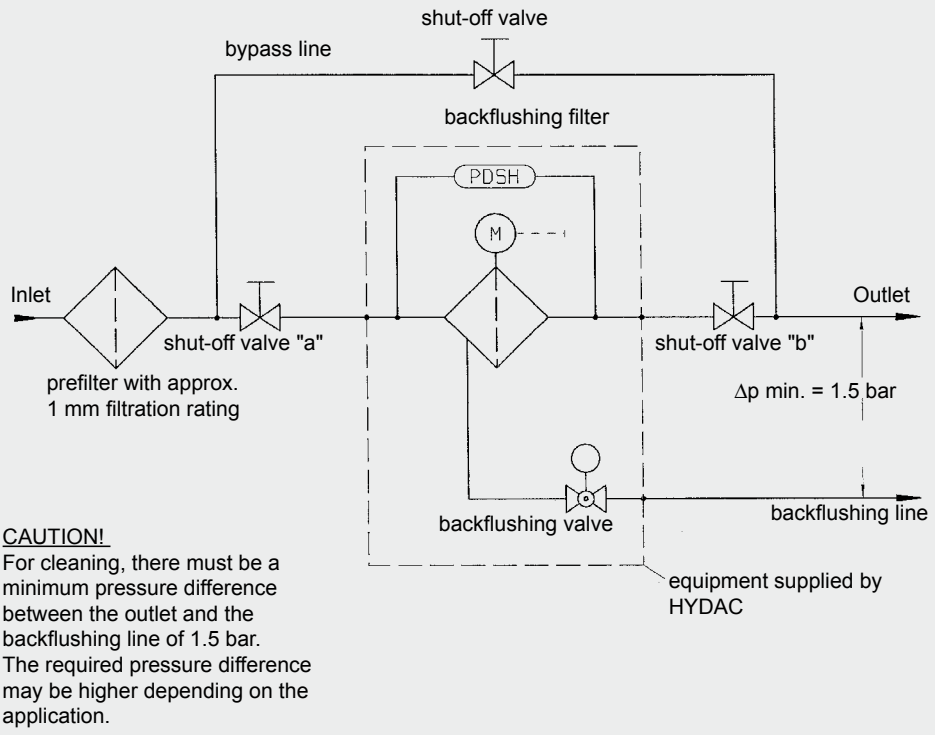
2.3 OVERVIEW OF TECHNICAL SPECIFICATIONS OF STANDARD MODELS

Frame Size	Pressure range [bar]	Connection Inlet/outlet	Backflushing line connection (PN16)	Weight ¹⁾ [kg]	Volume [l]	No. of elements	Filtration area [cm²]	Backflush volume [l]
RF4-1	6	G 1"	G 1/2"	13	2.5	4 x KM	548	4
RF4-1	16	G 1"	G 1/2"	15	2.5	4 x KM	548	4
RF4-2	6	G 1 1/2"	G 3/4"	32	3.7	4 x KN	1420	13
RF4-2	16	G 1 1/2"	G 3/4"	63	3.7	4 x KN	1420	13

Max, permissible temperature for all AutoFilt® RF4: 90 °C

¹⁾ related to EPT version

2.4 CIRCUIT DIAGRAM



3. MODEL CODE AUTOFILT® RF4

RF4-2 - EPT 2 - NN - E - CO - 3 - 16 - X / SKNS100 - 1234567

Filter type

RF4-1 = AutoFilt® RF4, size 1
RF4-2 = AutoFilt® RF4, size 2

Control

M = manual
EPT = electro-pneumatic control (incl. pneumatic drive)
ET = electrical control

Type of voltage

0 = without control, without solenoid valve
1 = with control* and solenoid valve 230 V AC
2 = with control* and solenoid valve 24 V DC
3 = without control, with solenoid valve 230 V AC
4 = without control, with solenoid valve 24 V DC
only for ET control:
0C = without control*, drive 3 x 400 V/N/PE, 50 Hz
1C = with control*, drive 3 x 400 V/N/PE, 50 Hz
other voltages on request!

Materials

Lower part of filter	Upper part of filter	Note
AA = Aluminium ALMG3	Aluminium ALMG3	Only RF4-1, 16 bar
NN = Carbon steel, nickel-plated	Carbon steel, nickel-plated	Only RF4-2, 16 bar
EE = Stainless steel	Stainless steel	RF4-1, RF4-2, 6 bar

Internal parts

E = Stainless steel

Backflushing valve

0 = without backflushing valve
CO = coaxial valve, brass
CON= coaxial valve, nickel-plated brass (only on request!)
COE= coaxial valve, stainless steel (only on request!)
KN = ball valve, nickel-plated brass(only on M or EPT control models)
KE = ball valve, stainless steel (only on M or EPT control models) (only on request!)

Differential pressure monitoring

0 = without differential pressure monitoring
1 = fixed value: 0,5 bar, Type DS 32, N/O contact
2 = adjustable: 0.1 - 1 bar, Type DS 31, (N/O) contact
3 = fixed value: 0.5 bar, Type DS 32, N/C valve
4 = Adjustable: 0.1 - 1 bar, Type DS 31, N/C valve
5 = visual clogging indicator (only for manual version)
7 = fixed value 0.5 bar, Type GW, N/C contact

Pressure range

06 = 6 bar (housing fastened with clamp), only for housings in stainless steel design
16 = 16 bar (filter upper section threaded)
25 = 25 bar, only for RF4-1 (only on request!)

Modification number

X = the latest version is always supplied

Elements / filtration rating

M = For magnet technology, add M
S = for Superflush, add S

For RF4-1:
KMS= slotted tube 30 µm to 1000 µm
KMD= SuperMesh 25 µm, 40 µm, 60 µm; other filtration ratings available on request

For RF4-2:
KNS= slotted tube30 µm to 1000 µm
KND= SuperMesh 25 µm, 40 µm, 60 µm; other filtration ratings available on request

Drawing number

For special models

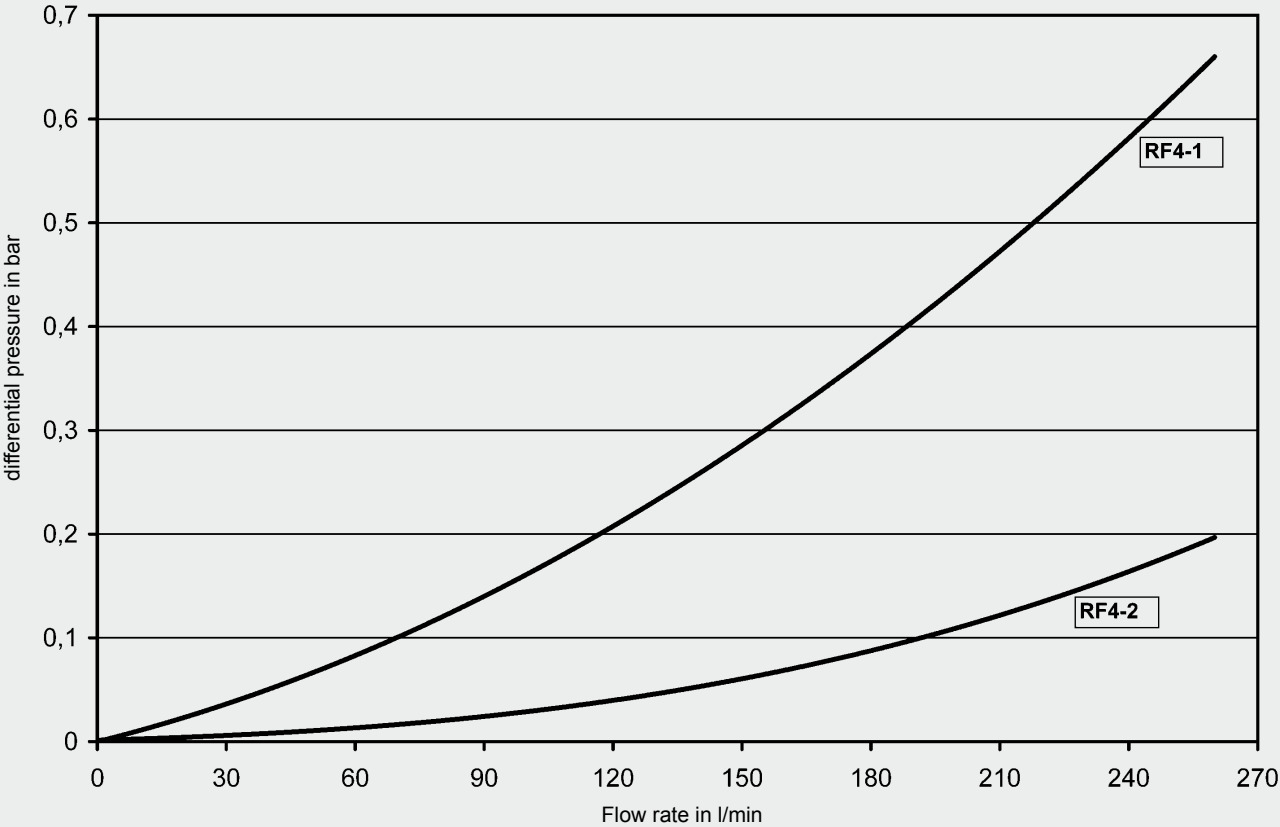
Preferred versions are marked in bold!

* Supply voltage of control 110 - 230 V AC, 50 Hz / 110 – 120 V AC, 60 Hz

4. FILTER CALCULATION / SIZING

4.1 PRESSURE DROP CURVES

The pressure drop curves apply to water.



It is crucial when operating the AutoFilt.®RF4 that there is a differential pressure between the backflushing line and the filter outlet of at least 1.5 bar. This minimum pressure differential ensures the operation of the filter.

In order to be able to size the filter correctly, the following design data should be available:

- Flow rate
- Type of medium
- Materials/resistance
- Viscosity
- Required filtration rating
- Particulate loading in the fluid
- Type of contamination
- Operating pressure
- Operating pressure - must be below the boiling point of the medium
- Power supply and compressed air supply
- Pressure ratios after the AutoFilt.® RF4 (is there any back pressure?)
- Integration of the AutoFilt.® RF4 into the whole system

The AutoFilt.® RF4 is sized based on the pressure drop curve and, especially for emulsion applications, on the sizing table. Generally speaking, an initial Δp (clean filter condition) of 0.2 bar should not be exceeded.

The pressure drop curve is valid for filtration ratings of 100 – 1000 µm slotted tube and 25 µm, 40 µm and 60 µm SuperMesh. A further factor in the calculation is the flow velocity through the filter inlet. It should not exceed 4 m/s.

With reference to the sizing of AutoFilt.® RF4, a separate consideration and sizing must be applied for water applications and emulsion applications due to different contamination loads (see 4.2 Cooling Lubricant Calculation Tables).

4.2. CALCULATION TABLES

The calculation tables form an important basis for selection of the AutoFilt.® RF4. In particular the high contamination load in the emulsion applications requires that the filter should be calculated more generously. The following points must also be observed for emulsion applications:

- Validity of the tables for emulsions and oils up to a viscosity of 15 mm²/s.
- For applications in the field of cast iron processing, grinding, honing and for fluids with a viscosity over 15 mm²/s, you must contact the Head Office!

4.2.1 Water applications

Fluid	Max. flow rate [l/min]	
	RF4-1	RF4-2
Water	120	220

The flow rate ranges indicated apply to filtration ratings ≥ 100 µm.

4.2.2 Cooling lubricants

Fluid: Emulsion ¹⁾

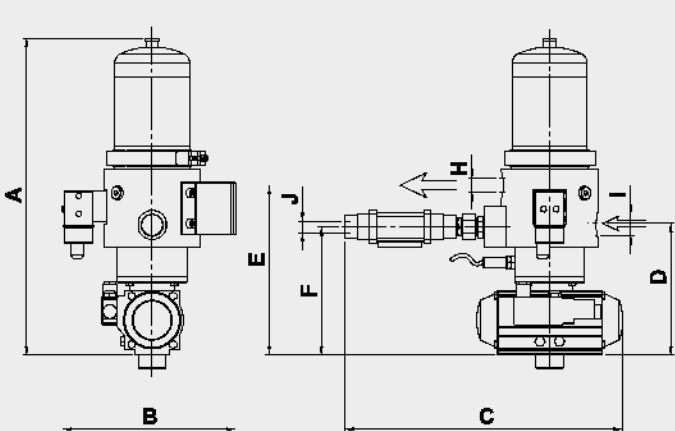
Machined material	Type of machining	Max. flow rate [l/min]	
		RF4-1	RF4-2
Aluminium	Cutting	100	200
Cast iron ¹⁾	Cutting	70	160
Carbon steel	Cutting	80	180
Stainless steel	Cutting	80	180
Aluminium	Cutting	90	200
Cast iron	Grinding	50	140
Carbon steel	Grinding	60	150
Stainless steel	Grinding	60	150

The flow rate ranges indicated apply to filtration ratings ≥ 100 µm and a maximum contamination capacity of 120 mg/l.

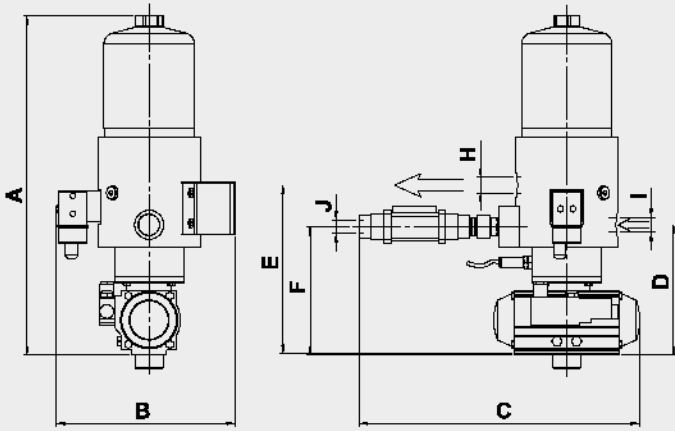
¹⁾ For other application contact our Technical Sales Department at Head office.

5. DIMENSIONS
5.1 DIMENSIONS OF RF4 WITH COAXIAL VALVE

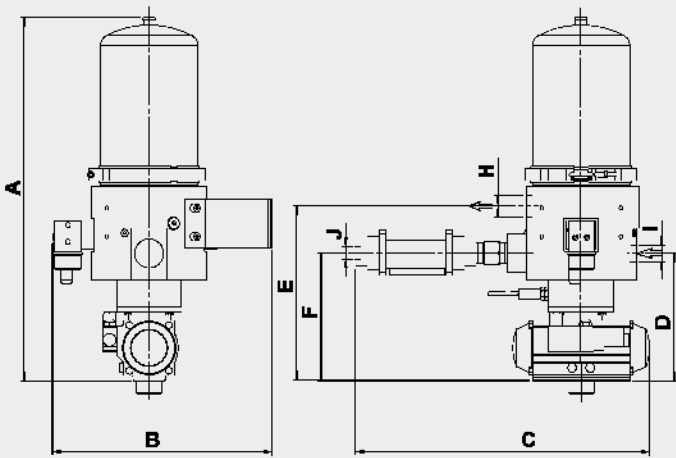
RF4-1 (6 bar, stainless steel with coaxial valve)



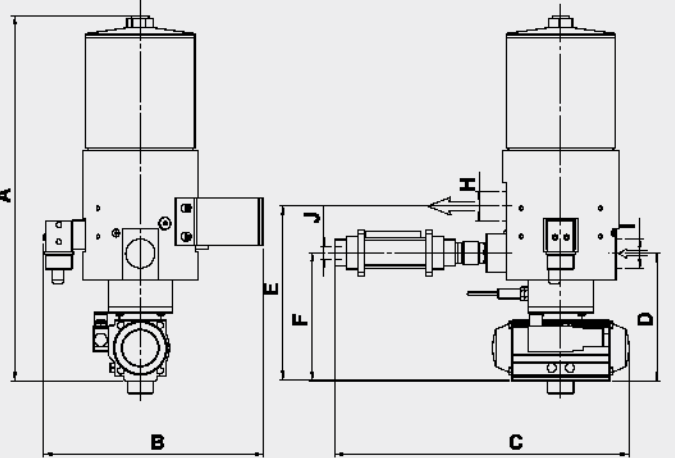
RF4-1 (16 bar with coaxial valve)



RF4-2 (6 bar, stainless steel with coaxial valve)



RF4-2 (16 bar with coaxial valve)

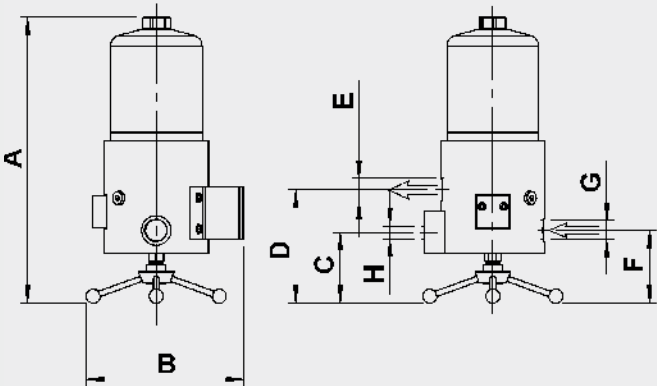


- The filter must not be used as a pipe support.
- The dimensions quoted have ± 5 mm tolerances.

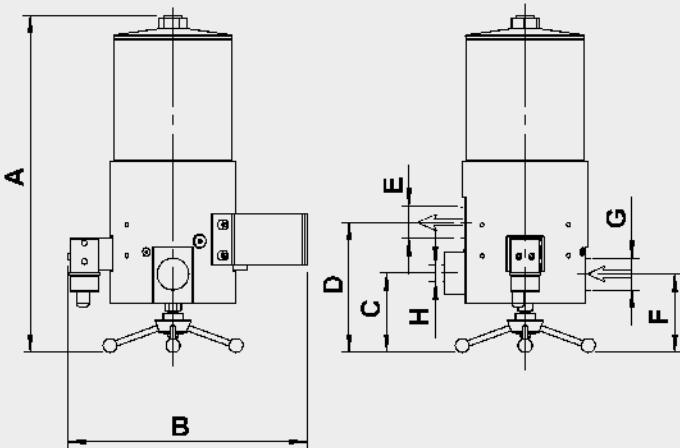
Type	A	B	C	D	E	F	H	I	J
RF4 - 1 (16 bar with coaxial valve)	490	258	405	190	245	185	1"	1"	1/2"
RF4 - 1 (6 bar stainless steel with coaxial valve)	457	250	405	190	245	185	1"	1"	1/2"
RF4 - 2 (16 bar with coaxial valve)	562	339	454	196	269	197	1 1/2"	1 1/2"	3/4"
RF4 - 2 (6 bar stainless steel with coaxial valve)	599	339	454	196	269	197	1 1/2"	1 1/2"	3/4"

5.2 DIMENSIONS OF SIZES 2

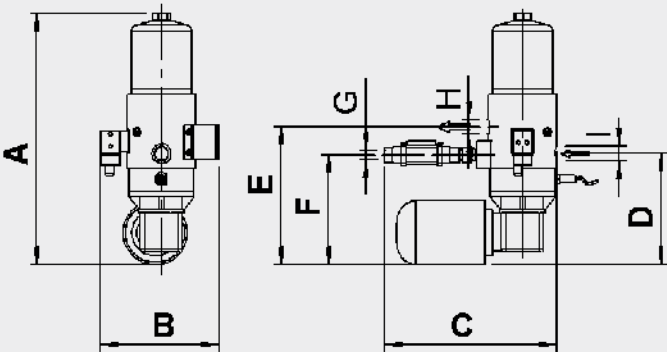
RF4-1-M-16 bar, manual design



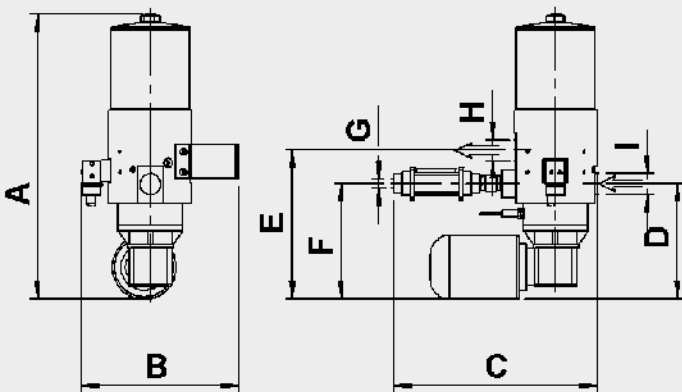
RF4-2-M-16 bar, manual design



RF4-1-ET-16 bar, electrical design



RF4-2-ET-16 bar, electrical design



- The filter must not be used as a pipe support.
- The dimensions quoted have ± 5 mm tolerances.

Type	A	B	C	D	E	F	G	H	I
RF4-1-M-16 bar	405	224	100	161	1"	103	1"	1/2"	
RF4-2-M-16 bar	478	339	113	184	1 1/2"	111	1 1/2"	3/4"	
RF4-1-ET-16 bar (with coaxial valve)	541	258	372	239	296	236	1/2"	1"	1"
RF4-2-ET-16 bar (with coaxial valve)	614	340	439	250	320	248	3/4"	1 1/2"	1 1/2"

NOTE

The information in this brochure relates to the operating conditions and applications described.
For applications or operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.

HYDAC Process Technology GmbH
Internet: www.hydac.com