Return Line Filter RFM with 2-Hole Mounting

Tank-top versions: up to 200 l/min, up to 10 bar

In-tank versions: up to 2,600 l/min, up to 10 bar

1. TECHNICAL SPECIFICATIONS

1.1 FILTER HOUSING

Construction

The filter housings are designed in accordance with international regulations. They consist of a filter head (with 2-hole flange), filter bowl and a screw-on cover plate.

Standard equipment:

- with bypass valve
- connection for a clogging indicator (Important: For RFM 75 to 185, please state mounting position for indicator!)

1.2 FILTER ELEMENTS

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

- ISO 2941
- ISO 2942
- ISO 2943
- ISO 3724
- ISO 3968
- ISO 11170
- ISO 16889

Contamination retention capacities in g

	Betamicron® (BN4HC)			
RFM	3 µm	5 µm	10 µm	20 µm
75	10.3	11.4	13.5	15.5
90	12.2	13.5	16.2	18.3
150	20.4	22.6	27.2	30.8
165	18.7	20.7	24.9	28.2
185	25.6	28.4	34.1	38.6
210	50.7	56.2	67.6	76.5
270	78.4	86.9	104.5	118.2
330	38.4	42.6	51.2	57.9
500	58.9	65.3	78.6	88.9
660	87.1	96.5	116.1	131.3
850	112.1	124.2	149.5	169.1
950	130.0	144.1	173.3	196.1
1300	181.0	200.7	241.4	273.1
2600	369.4	409.4	492.5	557.2

Filter elements are available with the following pressure stability values:

Betamicron® (BN4HC):	20 bar
ECOmicron® (ECON2):	10 bar
Stainl. steel wire mesh (W/HC):	20 bar
Paper (P/HC):	10 bar
Betamicron® / Aquamicron® (BN4AM):	10 bar
Aquamicron® (AM):	10 bar
Mobilemicron (MM):	10 bar

1.3 FILTER SPECIFICATIONS

Nominal pressure	10 bar
Temperature range	-30 °C to +100 °C (short-term: -40 °C)
Material of filter head	Aluminium: all RFM
Material of filter bowl	Polyamide: all RFM except 210, 270
Material of cover plate	Polyamide: all RFM
Type of clogging indicator	VMF Connection thread G 1/8 (return line indication)
Pressure setting of the clogging indicator	2 bar (others on request)
Bypass cracking pressure	3 bar (others on request)

1.4 SEALS

NBR (=Perbunan)

1.5 MOUNTING

As tank-top or in-tank filter

1.6 SPECIAL MODELS AND ACCESSORIES

- Extension tube on request
- Tank breather filter built into head on RFM 75 to 185
- Dipstick for RFM 75, 165, 185 (RFM 90 and 150 on request)
- 4-hole flange (see brochure "Return Line Filter RFM with 4-hole mounting")

1.7 SPARE PARTS

See Original Spare Parts List

1.8 CERTIFICATES AND APPROVALS

On request

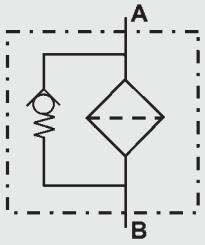
1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

1.10 IMPORTANT INFORMATION

- Filter housings must be earthed.
- When using electrical clogging indicators, the electrical power supply to the system must be switched off before removing the clogging indicator connector.
- If an extension tube is to be fitted to the two-piece filter housing, the tube must be made of synthetic material or thin-wall aluminium
- Extensions must be protected by fitting a bulkhead plate or other means of protection so that no forces can be transmitted to the filter housing or the extension.
- The filter can normally only be used for tank-mounting
- The filter must be fitted absolutely vertically, or after consultation with the manufacturer, only within the tolerances specified
- The filter must not be used as a suction filter
- Components (e.g. coolers) must not be installed after the filter

Symbol for hydraulic systems



E 7.106.13/03.12

2. MODEL CODE (also order example)

RFM BN/HC 165 B C 10 D 1 . X /-L24

2.1. COMPLETE FILTER: TANK-TOP VERSION

Filter type
RFM

Filter material of element
BN/HC Betamicron® (BN4HC)
ECO/N ECOmicron® (ECON2) - not for RFM SET-Version 2600
P/HC Paper
W/HC Stainless steel wire mesh
MM Mobilemicron

Size of filter or element
RFM: 75, 90, 150, 165, 185

Operating pressure
B = 10 bar

Type and size of port

Type	Port	Filter size 75	90	150	165	185
B	G ½	●	x	x	●	●
C	G ¾	●	●	●	●	●
D	G 1	●	x	x	●	●

KIT, SET, S versions see point 2.5

X on request

Filtration rating in µm
BN/HC, ECO/N: 3, 5, 10, 20 W/HC: 25, 50, 100, 200
P/HC: 10, 20 MM: 10, 15

Type of clogging indicator
Y plastic blanking plug in indicator port
A steel blanking plug in indicator port
B visual
C electrical
D visual and electrical
] for other clogging indicators see brochure no. 7.050../..

Type code
0 without port, no clogging indicator
1-3 see point 2.4 - note position of clogging indicator!

Modification number
X the latest version is always supplied

Supplementary details
A..-B.. setting pressure of indicator and cracking pressure of bypass in bar (e.g.: A5-B6)
L... light with appropriate voltage (24, 48, 110, 220 Volt)
LED 2 light emitting diodes up to 24 Volt
] only for clogging indicators type "D"
PSxx dipstick for RFM 75, 165, 185 on request
PZxx dipstick for RFM 90, 150 on request
T with tank breather filter
V FPM seals
Vxxx with extension tube (where xxx is the final dimension of the extension)
W suitable for HFA and HFC emulsions

2.2 REPLACEMENT ELEMENT

0165 R 010 BN4HC /-V

Size
0075, 0090, 0150, 0165, 0185, 0210, 0270, 0330, 0500, 0660, 0850, 0950, 1300, 2600

Type
R

Filtration rating in µm
BN4HC, ECON2: 003, 005, 010, 020 W/HC: 025, 050, 100, 200
P/HC: 010 MM: 010, 015

Filter material
BN4HC, ECON2, P/HC, W/HC, MM

Supplementary details
V (for descriptions, see point 2.1)

2.3 REPLACEMENT CLOGGING INDICATOR

VMF 2 D . X /-L24

Type
VMF connection thread G 1/8

Pressure setting
2 standard 2 bar, others on request

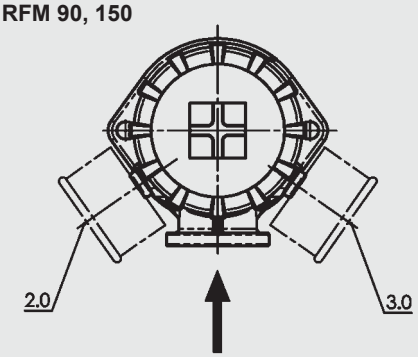
Type of clogging indicator
see Point 2.1

Modification number
X the latest version is always supplied

Supplementary details
L..., LED, V (for descriptions, see point 2.1)

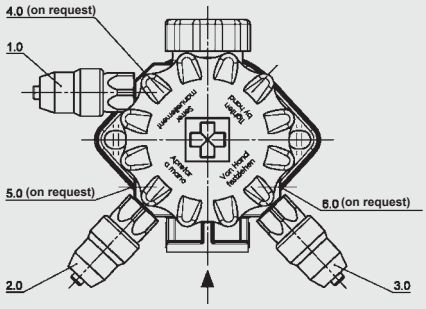
2.4 TYPE CODE: MOUNTING POSITION OF THE CLOGGING INDICATOR

RFM 90, 150



Type code	Mounting position of the clogging indicator	Type of indicator
2.X	Clogging indicator on left front, 45° to the inlet	VMF...
3.X	Clogging indicator on right front, 45° to the inlet	VMF...

RFM 75, 165, 185



Type code	Mounting position of the clogging indicator	Type of indicator
1.X	Clogging indicator on left back, 90° to the inlet	VMF...
2.X	Clogging indicator on left front, 45° to the inlet	VMF...
3.X	Clogging indicator on right front, 45° to the inlet	VMF...

NOTE
Other type codes on request.

2.5 MODEL CODE: IN-TANK MOUNTING FILTER

KIT VERSION

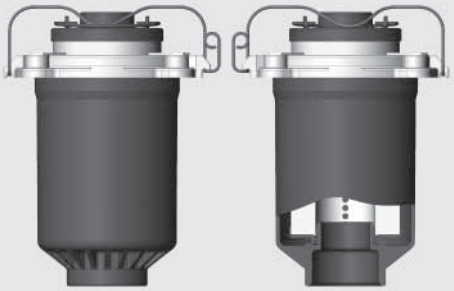
RFM BN/HC 165 KIT 10 W 1.0 /-V

Size
75, 90, 150, 165, 185, 210, 270, 330, 500, 661, 851

In-tank mounting version
KIT bowl only with element and seal

Supplementary details
B. bypass cracking pressure (e.g. B6 = 6 bar)
DFxxx spring (where xxx is the relevant length) - on request
G threaded connection in outlet (RFM 330 to 851)
V FPM seal
Vxxx extension tube (where xxx is the final dimension of the extension)

SET VERSION, screw-on Sizes 330 and 500



RFM BN/HC 330 SET 10 W 1.0 /-V

Size
330, 500

In-tank mounting version
SET bowl only with element and seal, plus adapter ring

Supplementary details
B. bypass cracking pressure (e.g. B6 = 6 bar)
G threaded connection in outlet
V FPM seal
Vxxx extension tube (where xxx is the final dimension of the extension)

SET VERSION, screw-on Sizes 950 to 2600

RFM ECO/N 950 SET 10 W 1.0 /-SO441

Filter material of element (only for this version)
ECO/N ECOmicron (ECON2)
BN/HC Betamicron (BN4HC)

Size
950, 1300, 2600

In-tank mounting version
SET element only with integral contamination retainer, element location spigot and spring

Supplementary details
SO441 this code must be specified! (also required for replacement element)
V FPM seal

S VERSION, weld-in version

RFM BN/HC 165 S 10 W 1.0 /-V

Size
75, 165, 185

In-tank mounting version
S bowl only with element, spring and seal, plus weld-in housing

Supplementary details
B. bypass cracking pressure (e.g. B6 = 6 bar)
V FPM seal
Vxxx extension tube (where xxx is the final dimension of the extension)

Note:
- Other supplementary details on request (or point 2.1)
- For replacement elements for in-tank filters, see point 2.2

3. FILTER CALCULATION / SIZING

The total pressure drop of a filter at a certain flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = given in diagrams (see point 3.1)

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$$

(*see point 3.2)

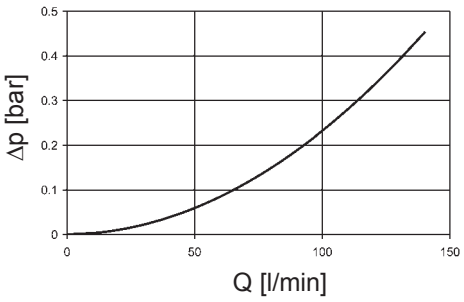
For ease of calculation, our Filter Sizing Program is available on request free of charge.

NEW: Sizing online at www.hydac.com

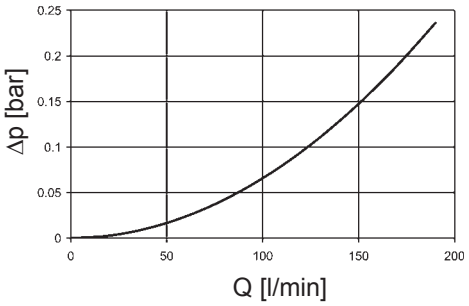
3.1 Δp-Q HOUSING CURVES BASED ON ISO 3968

The housing curves apply to mineral oil with a density of 0.86 kg/dm³ and a kinematic viscosity of 30mm²/s. In this case, the differential pressure changes proportionally to the density.

RFM 90, 150



RFM 75, 165, 185

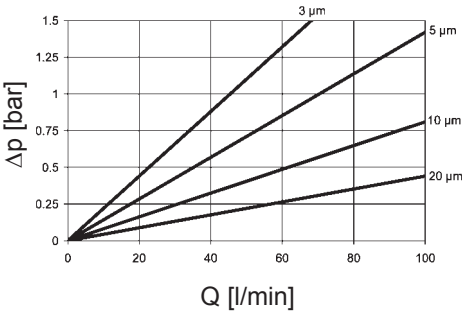


3.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

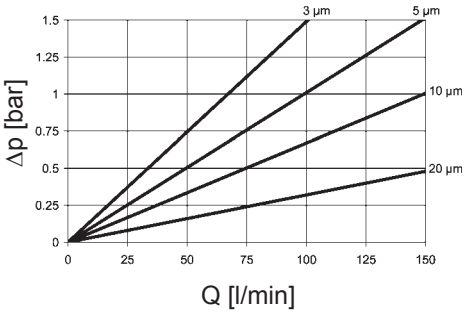
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

RFM	ECON2				W/HC
	3 µm	5 µm	10 µm	20 µm	–
75	-	-	8.1	4.4	0.702
90	-	-	6.7	3.2	-
150	8.9	6.0	4.0	1.9	-
165	11.2	7.8	4.5	2.4	0.324
185	8.9	6.1	3.3	1.8	-
210	-	-	-	-	-
270	-	-	-	-	-
330	4.2	2.7	1.7	1.2	0.162
500	3.0	1.9	1.3	0.8	0.108
600	-	-	-	-	-
660	1.9	1.2	0.8	0.5	0.081
850	1.5	1.0	0.7	0.4	0.063
950	1.2	0.8	0.5	0.4	0.054
1300	0.8	0.6	0.4	0.3	0.045
2600	0.4	0.3	0.2	0.1	0.018

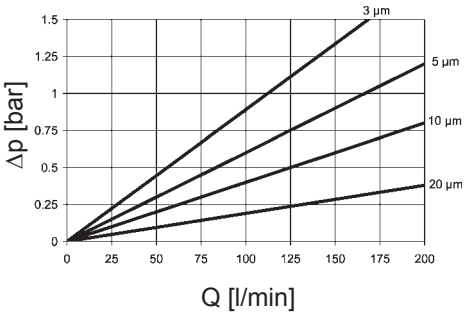
BN4HC: RFM 75



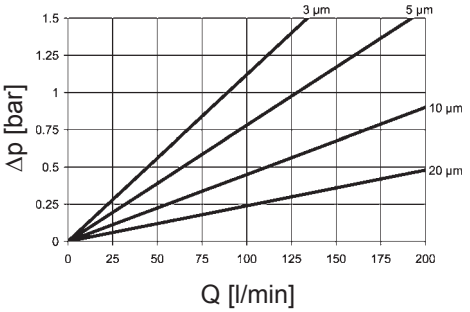
BN4HC: RFM 90



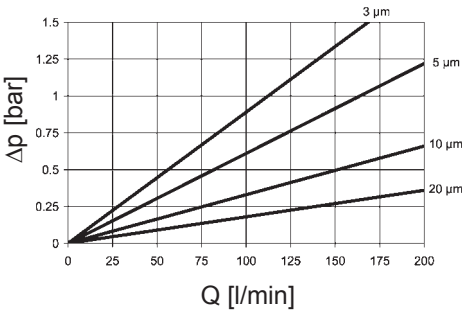
BN4HC: RFM 150



BN4HC: RFM 165

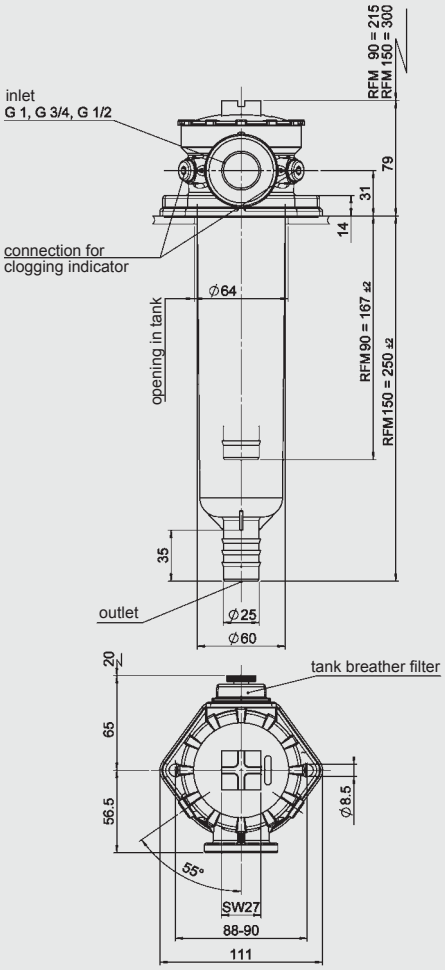


BN4HC: RFM 185

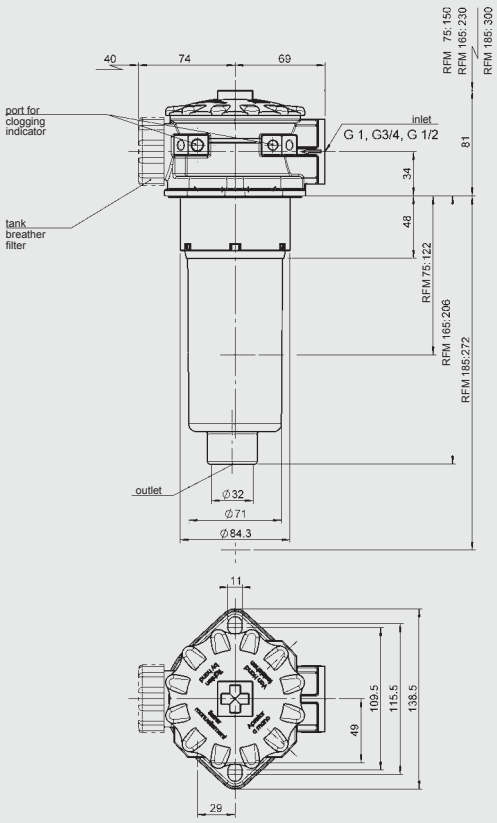


4. DIMENSIONS

RFM 90, 150



RFM 75, 165, 185



RFM	Weight incl. element [kg]	Vol. of pressure chamber [l]
75	0.90	0.60
90	0.54	0.60
150	0.75	0.80
165	1.10	0.90
185	1.14	1.10

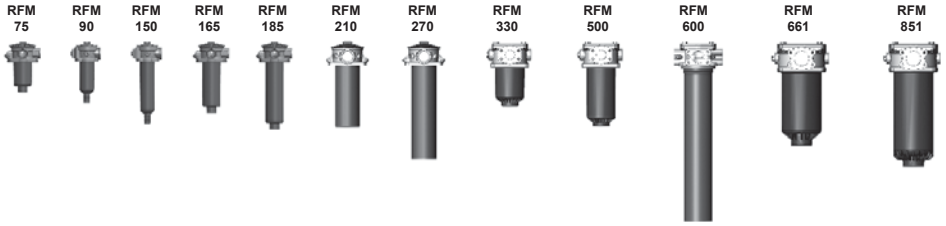
NOTE

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

HYDAC FILTERTECHNIK GMBH
Industriegebiet
D-66280 Sulzbach/Saar
Tel.: 0 68 97 / 509-01
Fax: 0 68 97 / 509-300
Internet: www.hydac.com
E-Mail: filter@hydac.com

Return Line Filter RFM with 4-Hole Mounting

Tank-top mounted versions: up to 850 l/min, up to 10 bar



1. TECHNICAL SPECIFICATIONS

1.1 FILTER HOUSING

Construction

The filter housings are designed in accordance with international regulations. They consist of a filter head (with 4-hole flange), filter bowl and a screw-on cover plate.

Standard equipment:

- with bypass valve
- connection for a clogging indicator (Important: please state mounting position for indicator!)

1.2 FILTER ELEMENTS

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

- ISO 2941
- ISO 2942
- ISO 2943
- ISO 3724
- ISO 3968
- ISO 11170
- ISO 16889

Contamination retention capacities in g

	Betamicron® (BN4HC)			
RFM	3 µm	5 µm	10 µm	20 µm
75	10.3	11.4	13.5	15.5
90	12.2	13.5	16.2	18.3
150	20.4	22.6	27.2	30.8
165	18.7	20.7	24.9	28.2
185	25.6	28.4	34.1	38.6
210	50.7	56.2	67.6	76.5
270	78.4	86.9	104.5	118.2
330	38.4	42.6	51.2	57.9
500	58.9	65.3	78.6	88.9
600	145.5	161.3	194.0	219.4
660	87.1	96.5	116.1	131.3
850	112.1	124.2	149.5	169.1
950	130.0	144.1	173.3	196.1
1300	181.0	200.7	241.4	273.1
2600	369.4	409.4	492.5	557.2

Filter elements are available with the following pressure stability values:

Betamicron® (BN4HC):	20 bar
ECOmicron® (ECON2):	10 bar
Stainl. steel wire mesh (W/HC):	20 bar
Paper (P/HC):	10 bar
Betamicron® / Aquamicron® (BN4AM):	10 bar
Aquamicron® (AM):	10 bar
Mobilemicron (MM):	10 bar

1.3 FILTER SPECIFICATIONS

Nominal pressure	10 bar
Temperature range	-30 °C to +100 °C (short-term: -40 °C)
Material of filter head	Aluminium: all RFM
Material of filter bowl	Polyamide: all RFM except 210, 270, 600 Steel: RFM 210, 270, 600
Material of cover plate	Polyamide: RFM 75 to 270 Aluminium: RFM 330 to 851
Type of clogging indicator	VR Connection thread G 1/2 VMF Connection thread G 1/8 (return line indication)
Pressure setting of the clogging indicator	2 bar (others on request)
Bypass cracking pressure	3 bar (others on request)

1.4 SEALS

NBR (= Perbunan)

1.5 INSTALLATION

As tank-top filter

1.6 SPECIAL MODELS AND ACCESSORIES

- Connections for filling the hydraulic system via return line element (RFM 330 and above)
- Extension tube on request
- Tank breather filter built into head on RFM 75 to 270
- Dipstick for RFM 75, 165, 185 (RFM 90 and 150 on request)
- 2-hole flange (see brochure "Return Line Filter RFM with 2-hole mounting")
- Multiport head on RFM 75, 165, 185
- Single port version for RFM 75, 165 and 185 on request

1.7 SPARE PARTS

See Original Spare Parts List

1.8 CERTIFICATES AND APPROVALS

On request

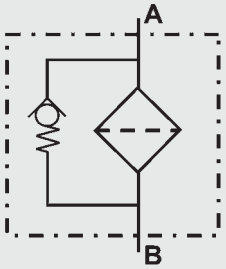
1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant operating fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

1.10 IMPORTANT INFORMATION

- Filter housings must be earthed.
- When using electrical clogging indicators, the electrical power supply to the system must be switched off before removing the clogging indicator connector.
- If an extension tube is to be fitted to the two-piece filter housing, the tube must be made of synthetic material or thin-wall aluminium.
- Extensions must be protected by fitting a bulkhead plate or other means of protection so that no forces can be transmitted to the filter housing or the extension.
- The filter can normally only be used for tank-mounting
- The filter must be fitted absolutely vertically, or after consultation with the manufacturer, only within the tolerances specified
- The filter must not be used as a suction filter
- Components (e.g. coolers) must not be installed after the filter

Symbol for hydraulic systems



2. MODEL CODE (also order example)

RFM BN/HC 500 B F F 10 D 1 . X /-L24

2.1. COMPLETE FILTER: TANK-TOP VERSION

Filter type
RFM

Filter material of element

BN/HC	Betamicron® (BN4HC)	ECO/N	ECOmicron® (ECON2) - not RFM 210, 270
P/HC	Paper	BN/AM	Betamicron®/Aquamicron® - only RFM 330 to 851
W/HC	Stainl. steel wire mesh	AM	Aquamicron® - only RFM 330 to 851
MM	Mobilemicron	* RFM 600 only available with material BN4HC!	

Size of filter or element
RFM: 75, 90, 150, 165, 185, 210, 270, 330, 500, 600, 661, 851

Operating pressure
B = 10 bar

Additional inlet

Type	Port	Filter size 75	165	185	330	500	600	661	851
D	G 1	●	●	●					
F	G 1 ½				●	●			
K	SAE DN 40				●	●			
M	SAE DN 65							●	●
Z	To customer specification						●		

not possible on RFM 90 and 150

Type and size of port (1 inlet)

Type	Port thread	Filter size 75	90	150	165	185	210	270	330	500	600	661	851
B	G ½	●	X	X	●	●							
C	G ¾	●	●	●	●	●							
D	G 1	●	X	X	●	●	●	●					
E	G 1¼						●	●			●		
F	G 1½						●	●	●	●	●		
K	SAE DN 40								●	●	●		
L	SAE DN 50										●		
M	SAE DN 65											●	●

X on request

Filtration rating in µm

BN/HC, ECO/N:	3, 5, 10, 20	BN/AM:	3, 10 (only RFM 330 to 851)	W/HC:	25, 50, 100, 200
P/HC:	10, 20	AM:	40 (only RFM 330 to 851)	MM:	10, 15

Type of clogging indicator
Y plastic blanking plug in indicator port
A steel blanking plug in indicator port
B/BM visual
C electrical
D visual and electrical
for other clogging indicators see brochure no. 7.050../..

Type code
0 without port, no clogging indicator
1-3 see point 2.5 - note position of clogging indicator!

Modification number
X the latest version is always supplied

Supplementary details
4L 4-hole flange for mounting (must be specified for RFM 75 to 185)
A..-B..setting pressure of indicator and cracking pressure of bypass in bar (e.g.: A5-B6)
BA filling connection G ½ (RFM 330 to 851)
G with threaded port at outlet (RFM 330 and above)
L... light with appropriate voltage (24, 48, 110, 220 Volt)
LED 2 light emitting diodes up to 24 Volt
only for clogging indicators type "D"
PSxx dipstick RFM 75, 165, 185 on request
PZxx dipstick RFM 90, 150 on request
T with tank breather filter (only for RFM 75 to 270)
V FPM seals
Vxxx with extension tube (where xxx is the final dimension of the extension)
W suitable for HFA and HFC emulsions
xxxxx RFM 600 only (see point 2.4)

2.2 REPLACEMENT ELEMENT

0500 R 010 BN4HC /-V

Size
0075, 0090, 0150, 0165, 0185, 0210, 0270, 0330, 0500, 0600, 0660, 0850

Type
R

Filtration rating in µm

BN4HC, ECON2:	003, 005, 010, 020	W/HC:	025, 050, 100, 200	AM:	040
P/HC:	010	BN4AM:	003, 010	MM:	010, 015

Filter material
BN4HC, ECON2, P/HC, W/HC, BN4AM, AM, MM

Supplementary details
V (for descriptions, see point 2.1)

2.3 REPLACEMENT CLOGGING INDICATOR

VR 2 D . X /-L24

Type
VR connection thread G 1/2
VMF connection thread G 1/8
] return line indicator

Pressure setting
2 standard 2 bar, others on request

Type of clogging indicator
see Point 2.1

Modification number
X the latest version is always supplied

Supplementary details
L..., LED, V (for descriptions, see point 2.1)

2.4 PORT CONFIGURATION RFM 600

Since there are numerous options for machining the ports on the head of the RFM 600, the code B**Z**x is selected here as standard. In order to determine the position and size of the ports, a 5-letter code is added as a supplementary detail. This is determined using the table below. Unused ports are indicated by a "0".

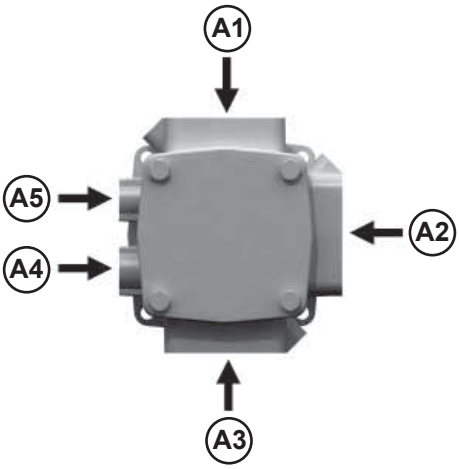
for RFM 600...B**ZK**

Port	A1	A2	A3	A4	A5
G ¾					C
G 1				D	
G 1¼	E	E	E		
SAE DN 40	K	K	K		
plugged	0	0	0	0	0

for RFM 600...B**ZL**

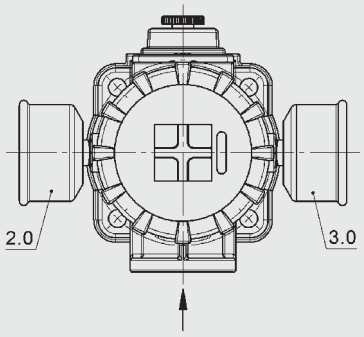
Port	A1	A2	A3	A4	A5
G ¾					(C)
G 1				D	
G 1½	F	(F)	F		
SAE DN 50	L	L	(L)		
plugged	(0)	0	0	(0)	0

Example:
RFM BN/HC 600 BZL 10 A 1.0 /-0FL0C



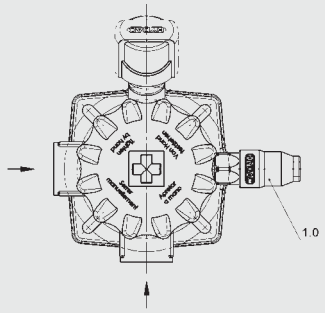
2.5 TYPE CODE: MOUNTING POSITION OF THE CLOGGING INDICATOR

RFM 90, 150 .../-4L



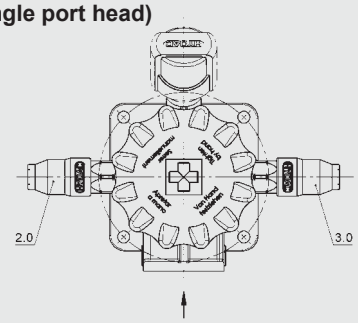
Type code	Mounting position of the clogging indicator	Type of indicator
2.X	Clogging indicator on left, 90° to the inlet	VMF...
3.X	Clogging indicator on right, 90° to the inlet	VMF...

RFM 75, 165, 185 .../-4L (Multiport head)



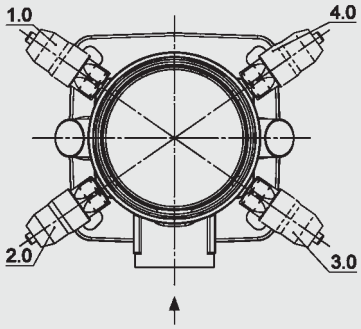
Type code	Mounting position of the clogging indicator	Type of indicator
1.X	see drawing	VMF...

On request:
RFM 75, 165, 185 .../-4L
(Single port head)



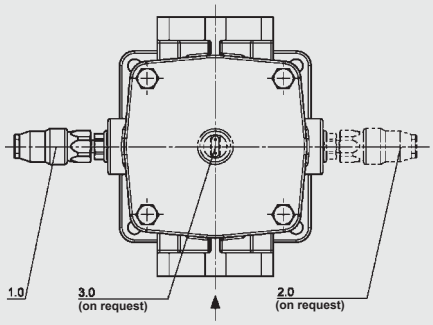
Type code	Mounting position of the clogging indicator	Type of indicator
2.X	Clogging indicator on left, 90° to the inlet	VMF...
3.X	Clogging indicator on right, 90° to the inlet	VMF...

RFM 210, 270



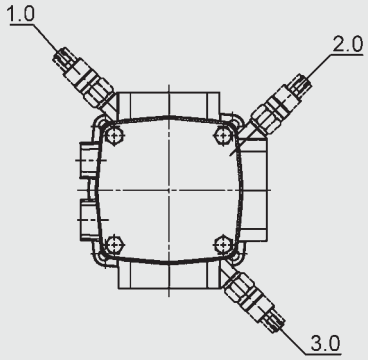
Type code	Mounting position of the clogging indicator	Type of indicator
1.X	Clogging indicator on left back, 135° to the inlet	VMF...
2.X	Clogging indicator on left front, 45° to the inlet	VMF...
3.X	Clogging indicator on right front, 45° to the inlet	VMF...
4.X	Clogging indicator on right back, 135° to the inlet	VMF...

RFM 330, 500



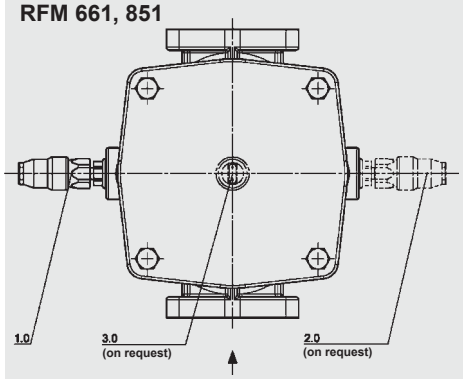
Type code	Mounting position of the clogging indicator	Type of indicator
1.X	Clogging indicator on left, 90° to the inlet	VR...

RFM 600



Type code	Mounting position of the clogging indicator	Type of indicator
1.X	see drawing	VMF...
2.X	see drawing	VMF...
3.X	see drawing	VMF...

RFM 661, 851



Type code	Mounting position of the clogging indicator	Type of indicator
1.X	Clogging indicator on left, 90° to the inlet	VR...

NOTE
Other type codes on request.

2.6 RETURN LINE FILTERS
RFM ALL-PLASTIC

The RFM All-Plastic filter provides a cost-effective alternative to the standard RFM product range.

This filter is an all-plastic version with a simple hose connection as the return line port.

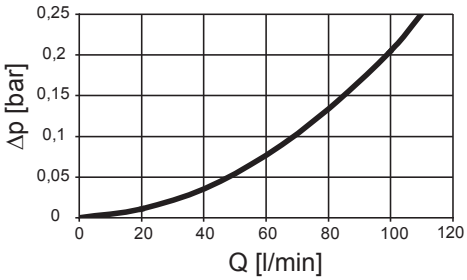
The well-known HYDAC element technology is of course available for these filter types

Nominal pressure: 7 bar
Flow rate up to 100 l/min
Temperature range: -30 °C to +100 °C

Δp-Q HOUSING CURVES
BASED ON ISO 3968

The housing curves apply to mineral oil with a density of 0.86 kg/dm³ and a kinematic viscosity of 30mm²/s.

In this case, the differential pressure changes proportionally to the density.



Model Code

RFMP	BN/HC	165	Y	HB	10	A	1	.X	/-4L-B6

Type
RFMP

Filter material
BN/HC Betamicron
ECO/N ECOmicron
MM Mobilemicron

Size
165

Operating pressure
Y 7 bar

Type of connection
HB Hose connection (hose barb)

Filtration rating
BN/HC, ECO/N 3, 5, 10, 20
MM 8, 10, 15

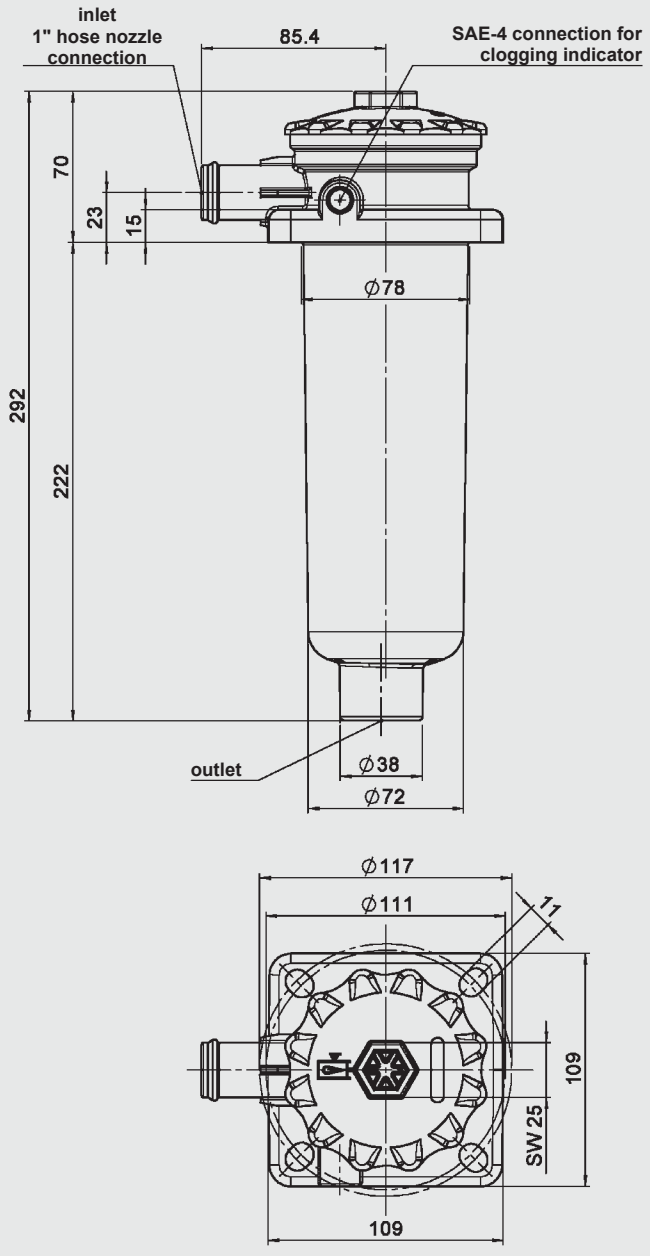
Type of clogging indicator (VA)
A steel blanking plug in indicator port

Type code
1

Modification number
X The latest version is always supplied

Supplementary details
4L 4-hole flange for mounting = **must be specified!**
B6 Bypass 6 bar

Dimensions



3. FILTER CALCULATION / SIZING

The total pressure drop of a filter at a certain flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = \text{(see Point 3.1)}$$

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$$

(*see point 3.2)

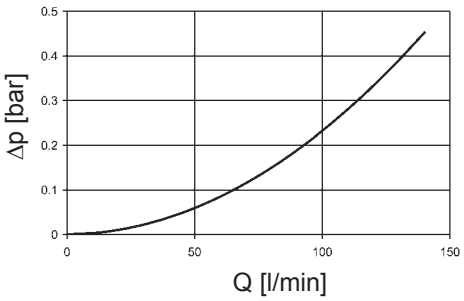
For ease of calculation, our Filter Sizing Program is available on request free of charge.

NEW: Sizing online at www.hydac.com

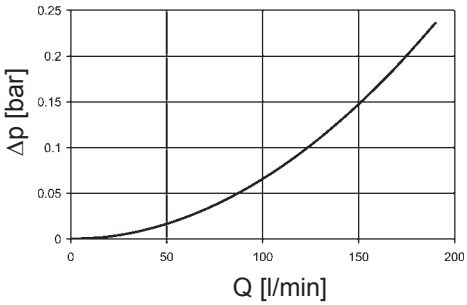
3.1 Δp-Q HOUSING CURVES BASED ON ISO 3968

The housing curves apply to mineral oil with a density of 0.86 kg/dm³ and a kinematic viscosity of 30mm²/s.
In this case, the differential pressure changes proportionally to the density.

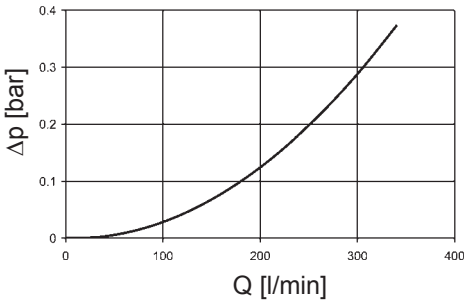
RFM 90, 150



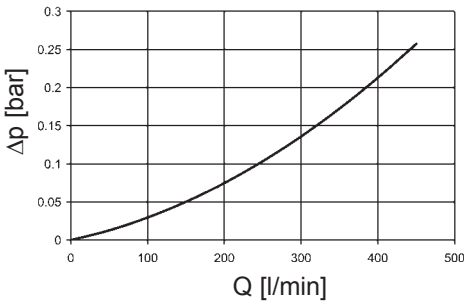
RFM 75, 165, 185



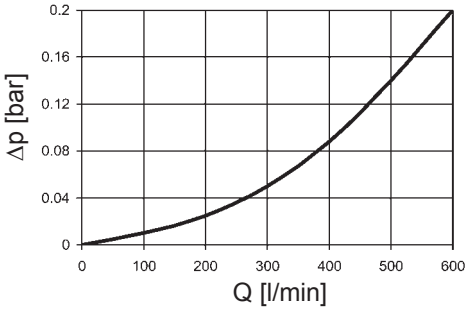
RFM 210, 270



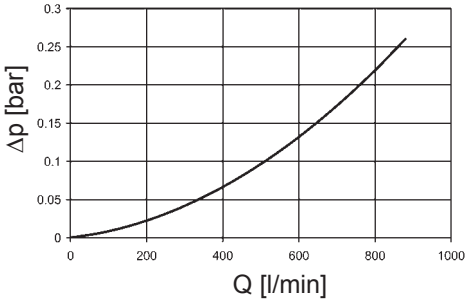
RFM 330, 500



RFM 600



RFM 661, 851

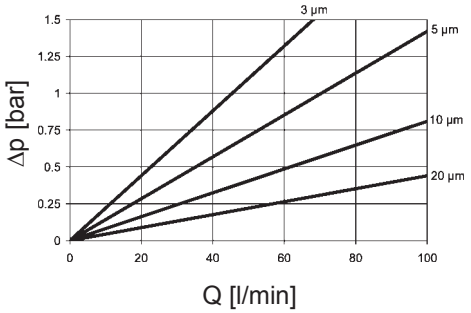


3.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

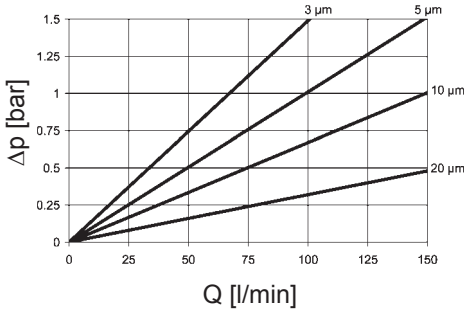
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

RFM	ECON2				W/HC
	3 µm	5 µm	10 µm	20 µm	–
75	-	-	8.1	4.4	0.702
90	-	-	6.7	3.2	-
150	8.9	6.0	4.0	1.9	-
165	11.2	7.8	4.5	2.4	0.324
185	8.9	6.1	3.3	1.8	-
210	-	-	-	-	-
270	-	-	-	-	-
330	4.2	2.7	1.7	1.2	0.162
500	3.0	1.9	1.3	0.8	0.108
600	-	-	-	-	-
660	1.9	1.2	0.8	0.5	0.081
850	1.5	1.0	0.7	0.4	0.063

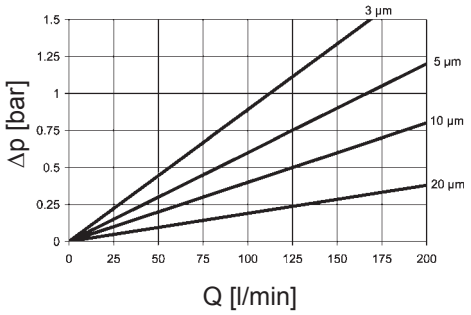
BN4HC: RFM 75



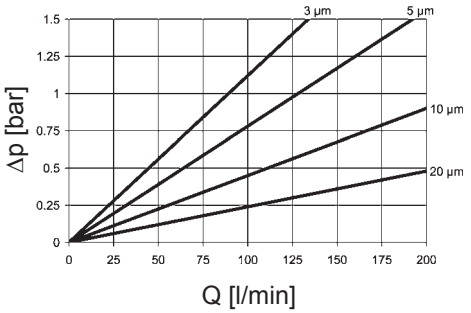
BN4HC: RFM 90



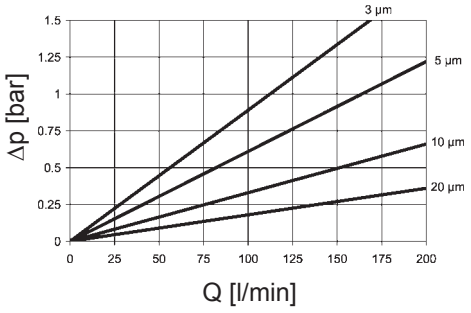
BN4HC: RFM 150



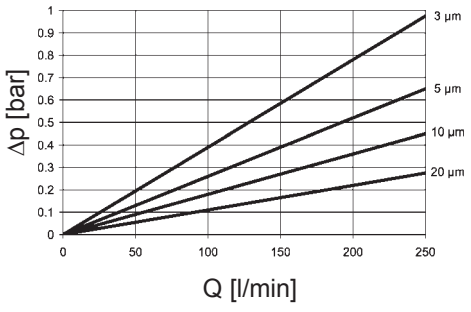
BN4HC: RFM 165



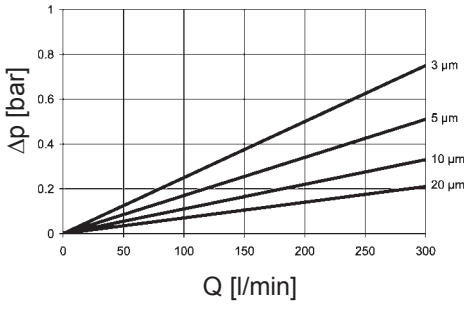
BN4HC: RFM 185



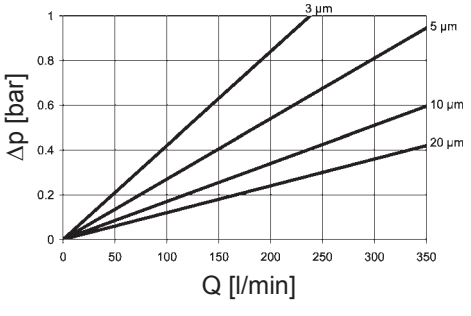
BN4HC: RFM 210



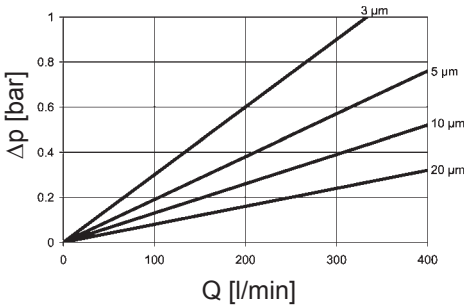
BN4HC: RFM 270



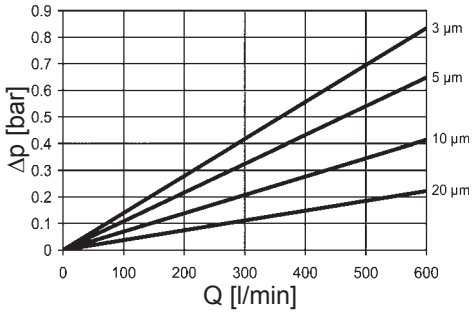
BN4HC: RFM 330



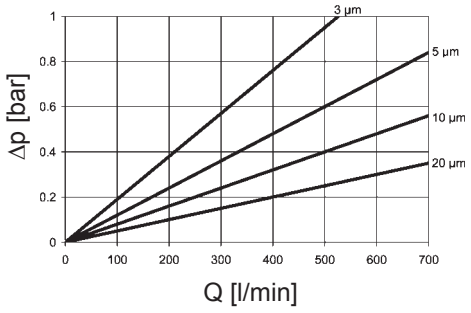
BN4HC: RFM 500



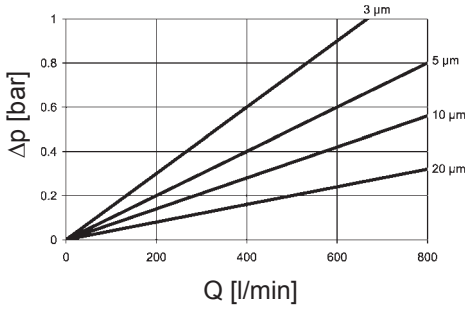
BN4HC: RFM 600



BN4HC: RFM 660

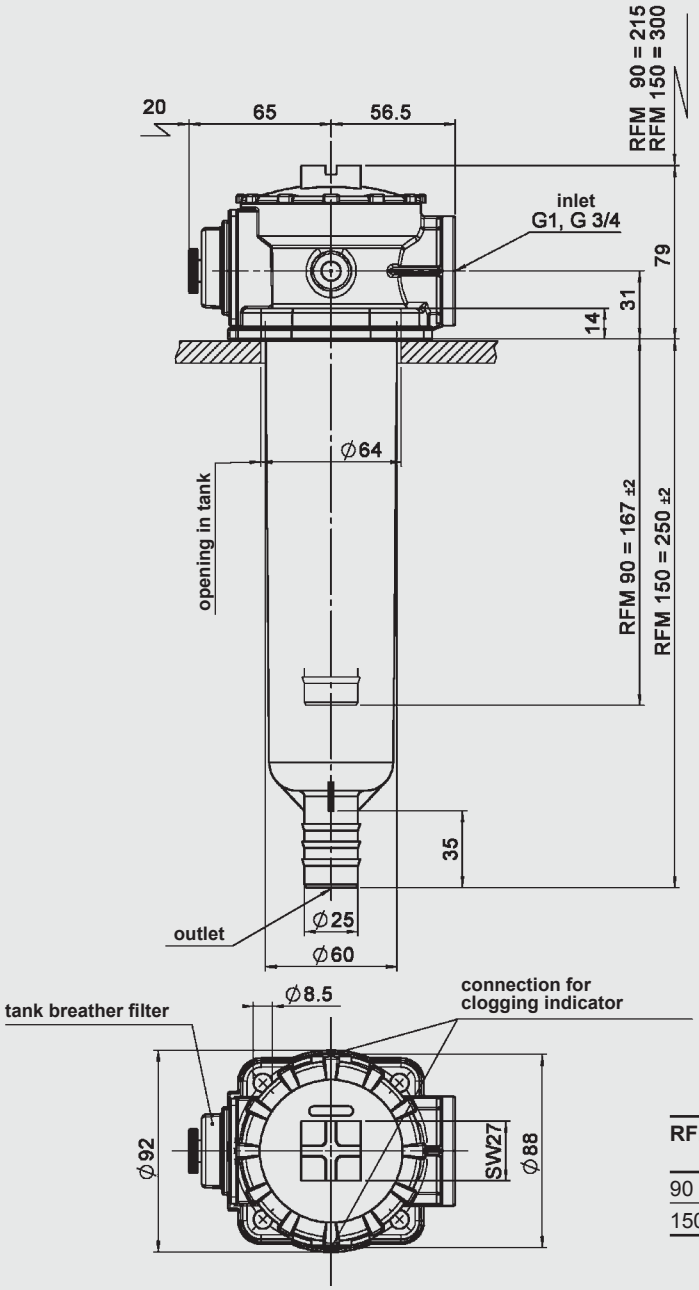


BN4HC: RFM 850

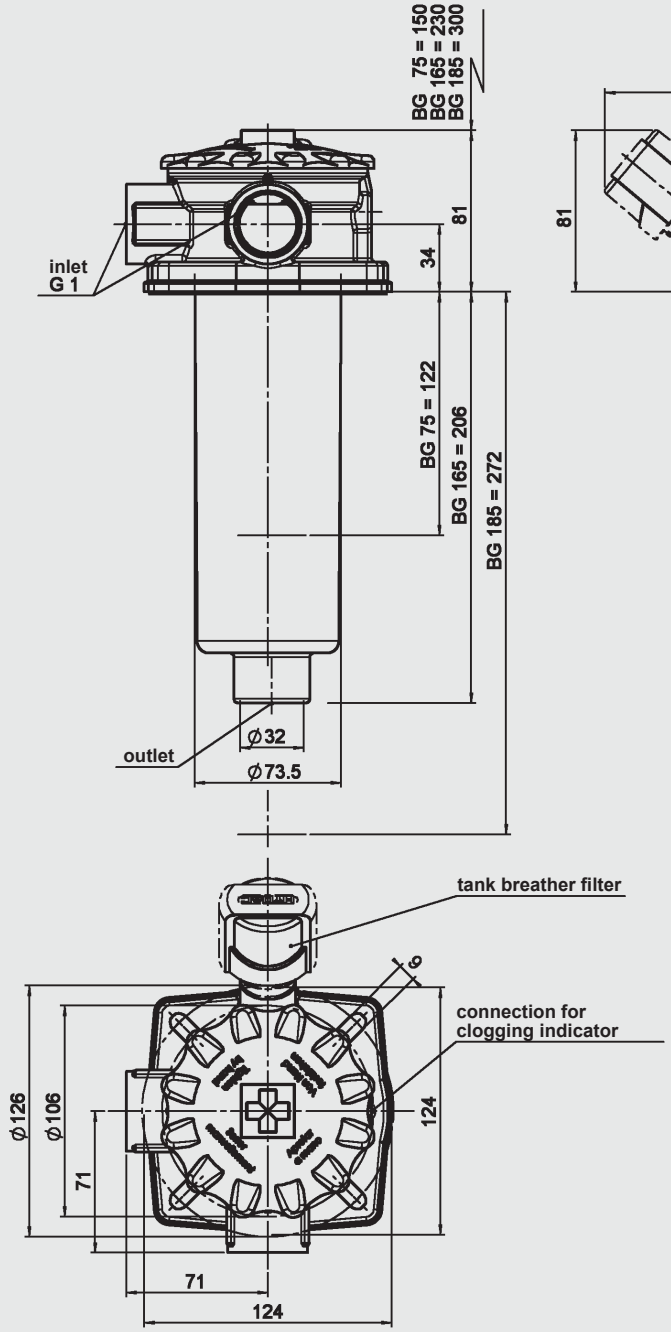


4. DIMENSIONS

RFM 90, 150 .../-4L



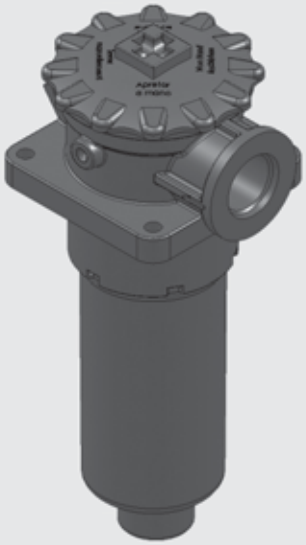
RFM	Weight incl. element [kg]	Vol. of pressure chamber [l]
90	0.54	0.60
150	0.75	0.80



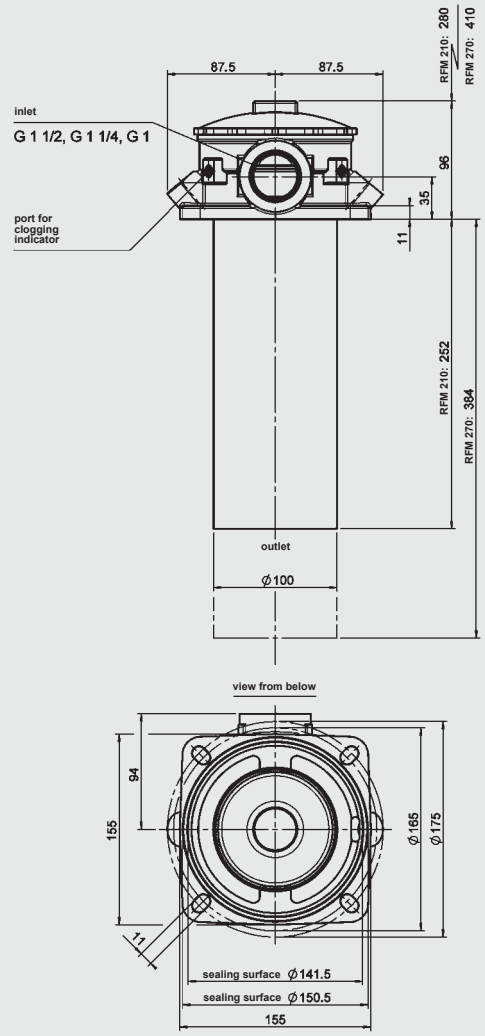
RFM	Weight incl. element [kg]	Vol. of pressure chamber [l]
75	0.90	0.60
165	1.10	0.90
185	1.14	1.10

MULTIPORT HEAD

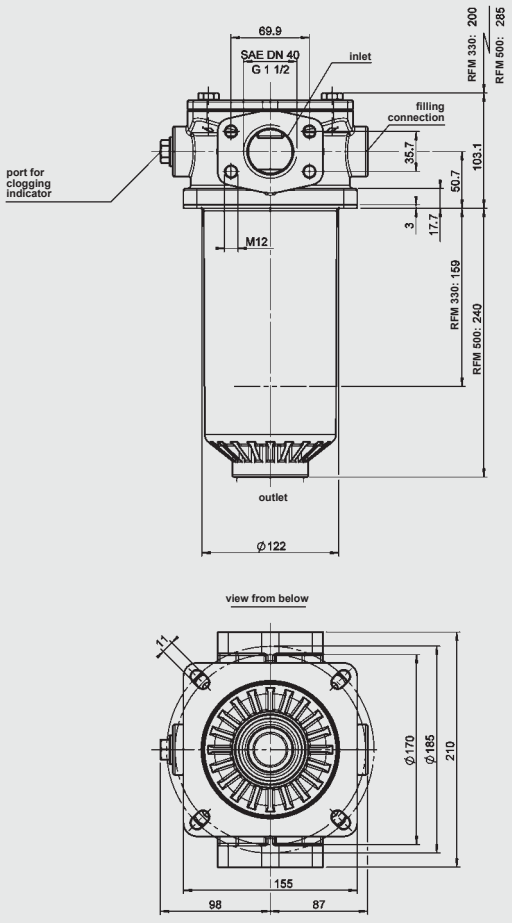
ON REQUEST:
SINGLE PORT HEAD



RFM 210, 270

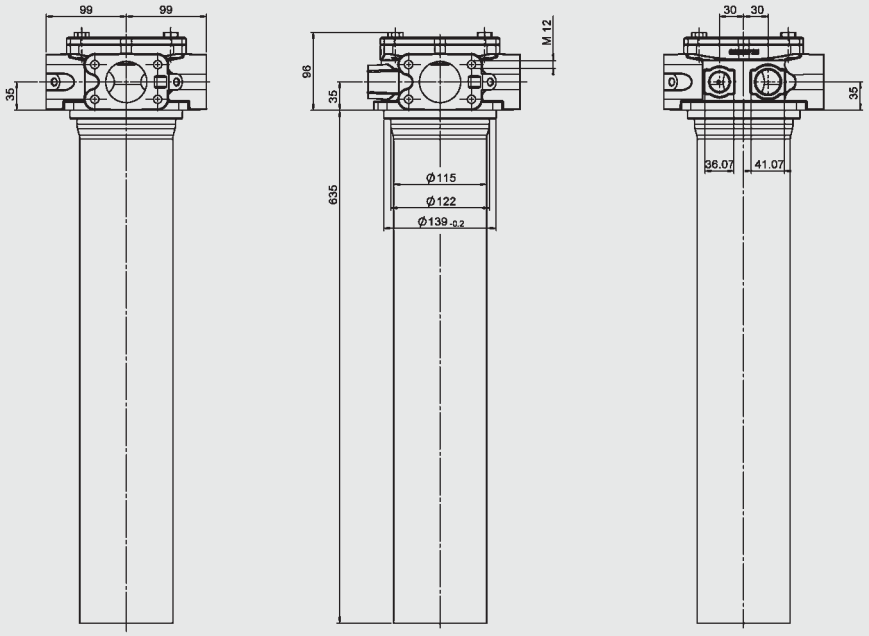


RFM 330, 500

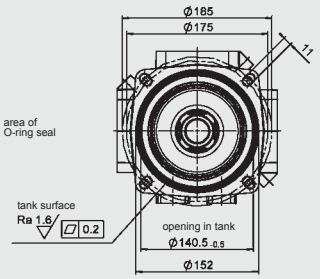


RFM	Weight incl. element [kg]	Vol. of pressure chamber [l]
210	3.10	2.20
270	4.30	3.60
330	3.90	2.00
500	4.50	3.00

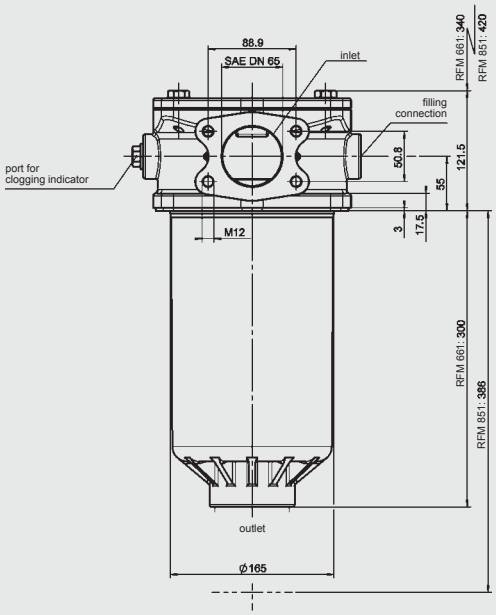
RFM 600

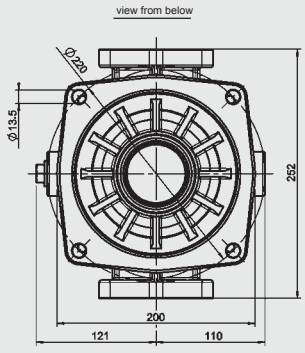


view from below



RFM 661, 851





RFM	Weight incl. element [kg]	Vol. of pressure chamber [l]
600	7.30	7.70
661	9.00	7.20
851	10.50	8.50

NOTES

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.

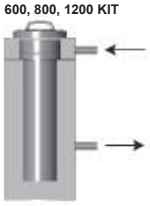
HYDAC FILTERTECHNIK GMBH
Industriegebiet
D-66280 Sulzbach/Saar
Tel.: 0 68 97 / 509-01
Fax: 0 68 97 / 509-300
Internet: www.hydac.com
E-Mail: filter@hydac.com

E 7.106.1.0/03.12

Return Line Filter RFMR

Element flow direction from in to out
In-tank versions:
up to 1,200 l/min, up to 10 bar

RFMR
600, 800, 1200 KIT



RFMR
600, 800, SET

1. TECHNICAL SPECIFICATIONS

1.1 FILTER HOUSING

Construction

The filter housings are designed in accordance with international regulations. There are two types of RFMR. The RFMR-KIT series consists of a housing tube and cover plate. The RFMR-SET series consists of a filter cover plate and element location spigot. The element is top-removable in both cases.

Standard equipment:

- with bypass valve
- magnetic core built into cover plate

1.2 FILTER ELEMENTS

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

- ISO 2941, ISO 2942, ISO 2943, ISO 3724, ISO 3968, ISO 11170, ISO 16889

Contamination retention capacities in g

Glass fibre (ULP)			
RFMR-KIT	5 µm	10 µm	25 µm
600	85	153	170
800	115	207	230
1200	170	306	340

Glass fibre with pre-filter (UHC)			
RFMR-KIT	5 µm	10 µm	20 µm
600	272	408	459
800	368	552	621
1200	544	816	918

Glass fibre (ULP)			
RFMR-SET	5 µm	10 µm	25 µm
600	85	153	170
800	115	207	230

Glass fibre with pre-filter (UHC)			
RFMR-SET	5 µm	10 µm	20 µm
600	272	408	459
800	368	552	621

Filter elements are available with the following pressure stability values:

Glass fibre (ULP):	6 bar
Glass fibre with pre-filter (UHC):	6 bar
Wire mesh (WR):	6 bar

1.3 FILTER SPECIFICATIONS

Nominal pressure	up to 10 bar
Temperature range	-30 °C to +120 °C
Material of housing tube	Steel
Material of cover plate	EN-GJS-400-15: RFMR-KIT EN-GJL-250: RFMR-SET
Bypass cracking pressure	3 bar (others on request)

1.4 SEALS

NBR (= Perbunan)

1.5 INSTALLATION

In-tank filter

1.6 SPECIAL MODELS AND ACCESSORIES

without magnetic core

1.7 SPARE PARTS

See Original Spare Parts List

1.8 CERTIFICATES AND APPROVALS

Test certificate 2.2
Other approvals on request

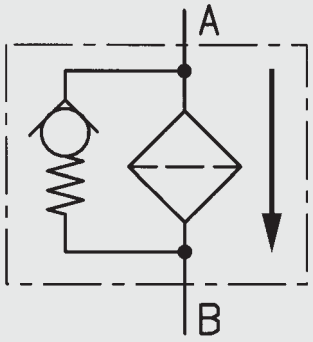
1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

1.10 IMPORTANT INFORMATION

- Filter housings must be earthed.
- When using electrical clogging indicators, the electrical power supply to the system must be switched off before removing the clogging indicator connector.

Symbol for hydraulic systems



2. MODEL CODE (also order example)

RFMR ULP 800 KIT 10 W 1 . X /-V

2.1 IN-TANK MOUNTED FILTER RFMR-KIT VERSION

Filter type
RFMR

Filter material of element
ULP Glass fibre
UHC Glass fibre with pre-filter
WR Wire mesh

Size of filter or element
RFMR: 600, 800, 1200

In-tank version
KIT housing tube and filter cover plate only

Filtration rating in µm
ULP : 5, 10, 25
UHC : 5, 10, 20
WR : 25, 40, 60

Type of clogging indicator
W without port, no clogging indicator

Type code
1

Modification number
X the latest version is always supplied

Supplementary details
no details = standard bypass cracking pressure B3 = 3 bar
V FPM seals
OM without magnetic core

2.1 IN-TANK MOUNTED FILTER RFMR-SET VERSION

RFMR ULP 800 SET 10 W 1 . X /-V

Filtertype
RFMR

Filter material of element
ULP Glass fibre
UHC Glass fibre with pre-filter
WR Wire mesh

Size of filter or element
RFMR: 600, 800

In-tank version
SET filter cover plate and element spigot only

Filtration rating in µm
ULP : 5, 10, 25
UHC : 5, 10, 20
WR : 25, 40, 60

Type of clogging indicator
W without port, no clogging indicator

Type code
1

Modification number
X the latest version is always supplied

Supplementary details
no details = standard bypass cracking pressure B3 = 3 bar
V FPM seals
OM without magnetic core

2.3 REPLACEMENT ELEMENT

0800 R 010 ULP /-V

Size
0600, 0800, 1200

Type
RX Elements for KIT version
RY Elements for SET version

Filtration rating in µm
ULP : 005, 010, 025
UHC : 005, 010, 020
WR : 025, 040, 060

Filter material
ULP, UHC, WR

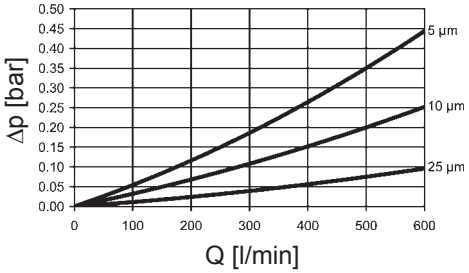
Supplementary details
V (for descriptions, see point 2.1)

3. FILTER CALCULATION / SIZING

3.1 GRAPHS FOR COMPLETE FILTER

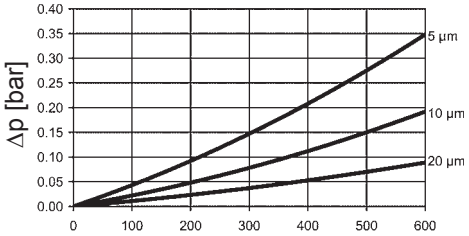
The curves for complete filters apply to mineral oil with a density of 0.86 kg/dm³ and a kinematic viscosity of 30mm²/s.

RFMR 600 KIT: ULP



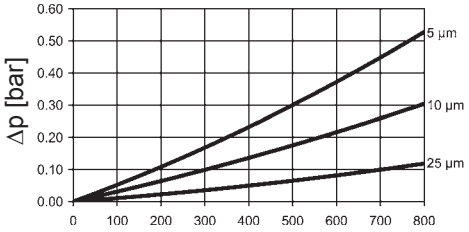
Q [l/min]

RFMR 600 KIT: UHC



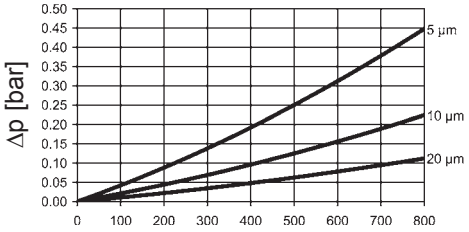
Q [l/min]

RFMR 800 KIT: ULP



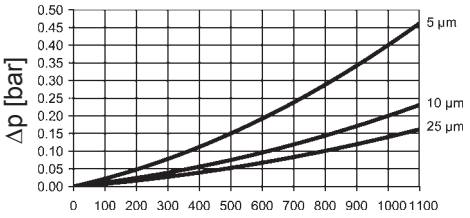
Q [l/min]

RFMR 800 KIT: UHC



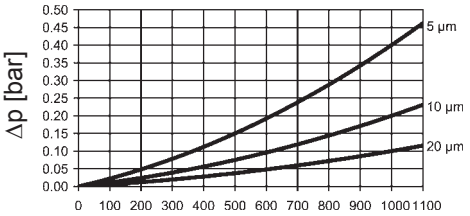
Q [l/min]

RFMR 1200 KIT: ULP



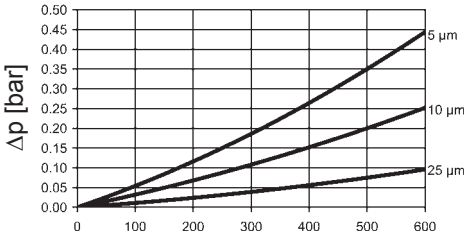
Q [l/min]

RFMR 1200 KIT: UHC



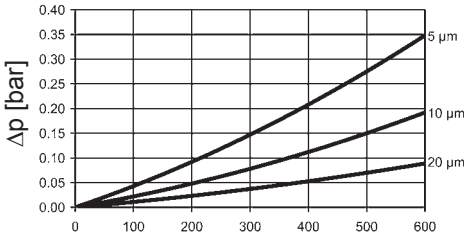
Q [l/min]

RFMR 600 SET: ULP



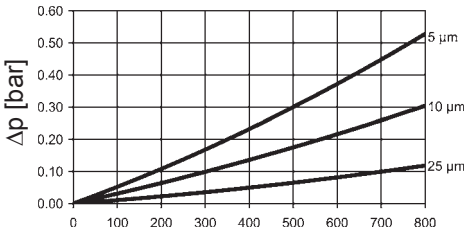
Q [l/min]

RFMR 600 SET: UHC



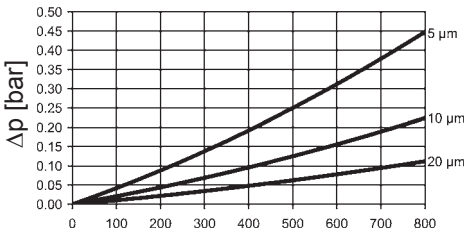
Q [l/min]

RFMR 800 SET: ULP



Q [l/min]

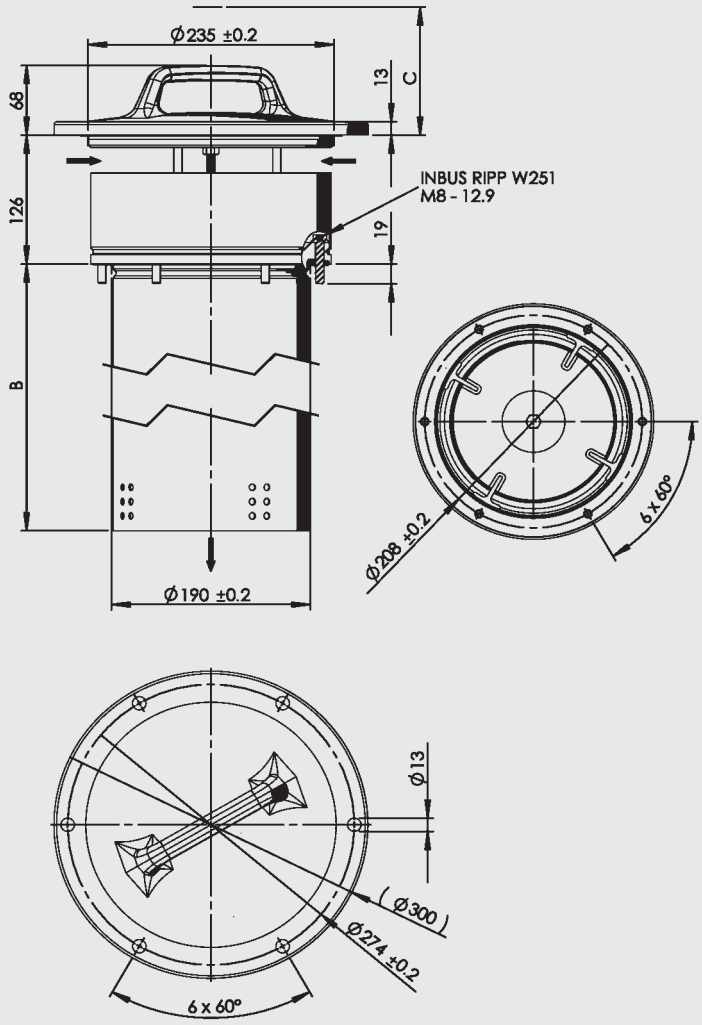
RFMR 800 SET: UHC



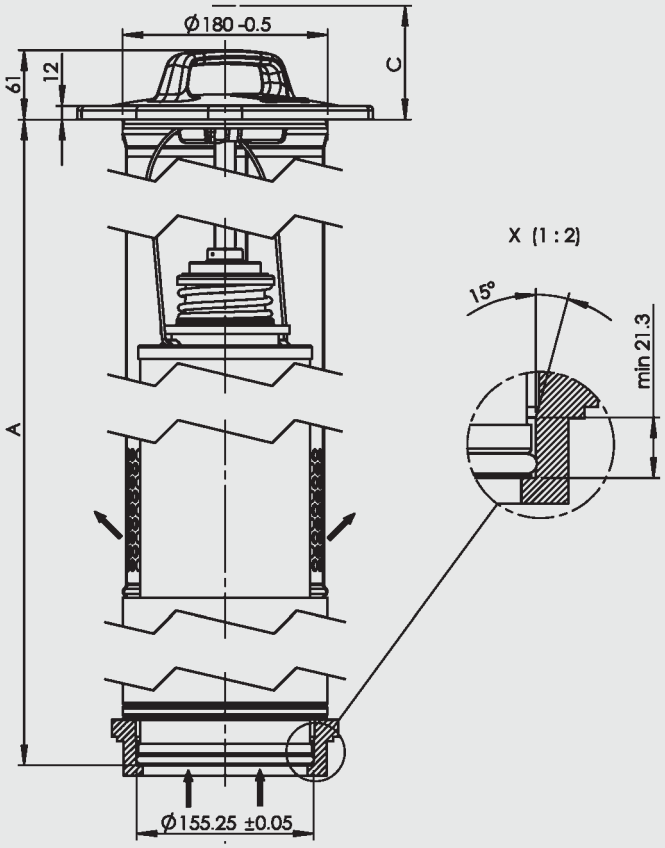
Q [l/min]

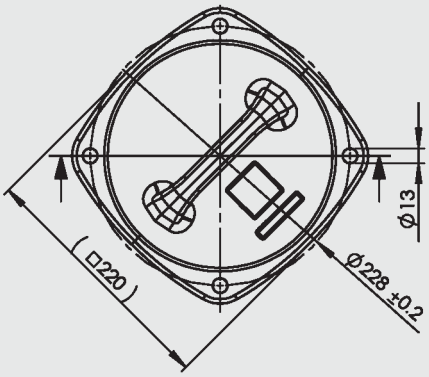
4. DIMENSIONS

RFMR 600 - 1200 KIT



RFMR 600 - 800 SET





RFMR KIT	B	C min.	Weight incl. element [kg]
600	694	570	23.9
800	680	685	25.2
1200	1324	1005	32.1

RFMR SET	A	C min.	Weight incl. element [kg]
600	780	775	11.0
800	980	975	12.2

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 FILTERTECHNIK GMBH
Industriegebiet
D-66280 Sulzbach/Saar, Germany
Tel.: 0 68 97 / 509-01
Fax: 0 68 97 / 509-300
Internet: www.hydac.com
E-mail: filter@hydac.com

Return line and Suction Boost Filter RKM

up to 800 l/min, up to 10 bar

1. TECHNICAL SPECIFICATIONS

1.1 FILTER HOUSING

Construction

The filter housings are designed in accordance with international regulations. They consist of a filter head, filter bowl and a screw-on cover plate.

Standard equipment:

- with bypass valve
- with back-pressure valve
- without anti-cavitation valve

Application

RKM return line & suction boost filters are ideally suited for use in equipment with two or more circuits. In particular this filter is the "first choice" for mobile machinery using hydrostatic drives (e.g. wheel loaders, fork-lift trucks, harvesting machines), if the return flow is greater than the flow required on the suction side under operating conditions.

Function

The return flow of the operating hydraulics is supplied to the filter via one or several inlets "A" and is cleaned by the filter element (full flow return line filtration). A pressure of 0.5 bar (standard) is applied inside the element by the back-pressure valve "V1".

This ensures that the filtered return line flow is available to the hydrostatic feed pumps connected in "B" ports (full flow suction boost filtration). The risk of cavitation is significantly reduced. The excess flow is drained to the tank via port "T". A bypass valve "V2" (standard = 2.5 bar) is fitted to relieve excessive back-pressures in the element (important on cold starts). This valve arrangement ensures that only finely filtered oil is available to the suction port during operation (exception: RKM 350).

With optional valve "V3", oil can be drawn from the tank for short periods, e.g. initial filling, venting after changing element.

1.2 FILTER ELEMENTS

The filter elements used in RKM filters are characterised by low back-pressures, especially at high viscosities (e.g. cold starts).

1.3 FILTER SPECIFICATIONS

Nominal pressure	10 bar
Temperature range	-30 °C to +100 °C (short-term: -40 °C)
Material of filter head	Aluminium
Material of filter bowl	Steel (all RKM except for RKM 300) Polyamide (RKM 300)
Material of cover plate	Polyamide (RKM 80 to 251, 350) Aluminium (RKM 300, 400, 800)
Type of clogging indicator	VMF – Connection thread G 1/8
Pressure setting of the clogging indicator	-0.2 bar (vacuum pressure) 2 bar (back-pressure) (others on request)
Bypass cracking pressure (V2)	2.5 bar (others on request)
Setting for back-pressure valve (V1)	0.5 bar (others on request)

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

- ISO 2941, ISO 2942, ISO 2943, ISO 3724, ISO 3968, ISO 11170 ISO 16889

Contamination retention capacities in g

	Mobilemicron		
RKM	8 µm	10 µm	15 µm
80	11.0	11.0	13.3
100	16.3	16.3	19.6
120	20.7	20.7	25.0
151	33.4	33.4	40.3
201	50.9	50.9	61.4
251	61.9	61.9	74.7
300	55.6	55.6	67.1
350	87.0	87.0	105.0
400	67.4	67.4	81.3
800	86.3	86.3	104.2

Pressure stability value: 10 bar

1.4 SEALS

Perbunan (=NBR)

1.5 MOUNTING

Tank-top filter

1.6 SPECIAL MODELS AND ACCESSORIES

- with bleed valve
- with multiport head (only RKM 80 to 251; see point 2.4)
- with integral thermal bypass valve (only RKM 151, 201, 251; see point 2.5)
- with anti-cavitation valve (V3)

1.7 SPARE PARTS

See Original Spare Parts List

1.8 CERTIFICATES AND APPROVALS

On request

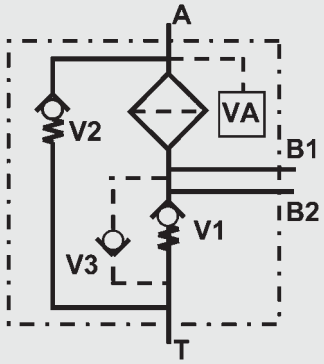
1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

1.10 IMPORTANT INFORMATION

- Filter housings must be earthed.
- When using electrical clogging indicators, the electrical power supply to the system must be switched off before removing the clogging indicator connector.

Symbol for hydraulic systems



VA = clogging indicator

E 7.108.4/03.12

2. MODEL CODE (also order example)

RKM MM 300 B T F 10 W 0 . X /-NR-EV

2.1 COMPLETE FILTER

Filter type
RKM

Filter material of element
MM Mobilemicron

Size of filter or element
RKM: 80, 100, 120, 151, 201, 251, 300, 350, 400, 800

Operating pressure
B 10 bar

Type and size of suction line

Type	Port	Filter size									
		80	100	120	151	201	251	300	350	400	800
T	2 x CS1¼				●	●	●	●			
V	2 x G1				●	●	●				
X	1 x G1	●	●	●					●		
Y	1 x G¾	●	●	●							
Z	To customer spec.	●	●	●	●*	●*	●*			●	●

Type and size of return line

Type	Port	Filter size									
		80	100	120	151	201	251	300	350	400	800
C	1 x G¾	●	●	●							
D	1 x G1	●	●	●							
E	1 x G1¼				●	●	●				
F	1 x CS1½							●			
G	1 x G1½								●		
Z	To customer spec.	●°	●°	●°	●*°	●*°	●*°			●	●

° only in conjunction with multiport head

* only in conjunction with thermal bypass valve

Filtration rating in µm
MM: 8, 10, 15

Type of clogging indicator
W without port for clogging indicator
Y plastic blanking plug in indicator port
A steel blanking plug in indicator port
F pressure switch
K return line and vacuum pressure gauge
R return line pressure gauge
UF vacuum switch

for other clogging indicators, see brochure no. 7.050../..

Type code
0 no indicator
1-5 see point 2.6

Modification number
X the latest version is always supplied

Supplementary details
no details = standard (without anti-cavitation valve; seals NBR; bypass valve 2.5 bar; back-pressure valve 0.5 bar)
B3-CV3.5 bypass valve with 3 bar cracking pressure and back-pressure valve with 3.5 bar cracking pressure (only RKM 350)
B6-CV3 bypass valve with 6 bar cracking pressure and back-pressure valve with 3 bar cracking pressure (only RKM 100, 300)
ES vent plug
EV air bleed valve
NR anti-cavitation valve (not on RKM 350)
NRF125 anti-cavitation valve and coarse strainer 125 µm (not on RKM 350)
ND pressure release valve in back-pressure valve
UT filter suitable for use when immersed horizontally in oil
V FPM seals

for symbols see point 2.7

xxxxx only RKM 80 to 251 (see point 2.4)
xxxxxxxx only RKM 400 and 800 (see point 2.4)
THxx only RKM 151, 201, 251 (see point 2.5)

2.2 REPLACEMENT ELEMENT

0300 RK 010 MM /-V

Size
0080, 0100, 0120, 0151, 0201, 0251, 0300, 0350, 0400, 0800

Type
RK

Filtration rating in µm
MM 008, 010, 015

Filter material
MM

Supplementary details
V FPM seal

2.3 REPLACEMENT CLOGGING INDICATOR

VMF 2 F . X

The return line indicator monitors the level of contamination in the element.
The vacuum indicator monitors the suction side pressure.

Type
VMF connection thread G 1/8

Pressure setting
0.2 -0.2 bar (vacuum pressure)
2 2 bar (back-pressure)

others on request

Type of clogging indicator (see Point 2.1)

Modification number
X the latest version is always supplied

2.4 PORT CONFIGURATION RKM 80 TO 251 MULTIPORT HEAD AND RKM 400 AND 800

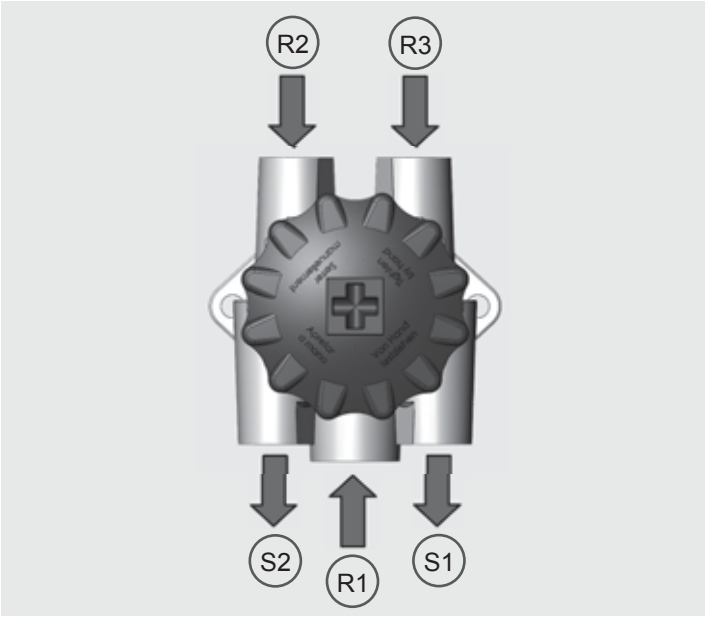
Since there are numerous options for machining the ports on the multiport head and the head of the RKM 400/800, the general code BZZ is selected here. In order to determine the position and size of the ports, a 5-digit or a 9-digit code is added as a supplementary detail. This is determined using the table below. Unused ports are indicated by a "0".

R = Return line port; S = Suction port

Port configuration RKM 80, 100, 120 Multiport

Position in code	1	2	3	4	5
Connection	R1	R2	R3	S1	S2
G ½		(B)	(B)	B	B
G ¾	(C)	C	C	(C)	(C)
1BSP	D				
Port plugged	0	0	0	0	0
Special port	Z	Z	Z	Z	Z

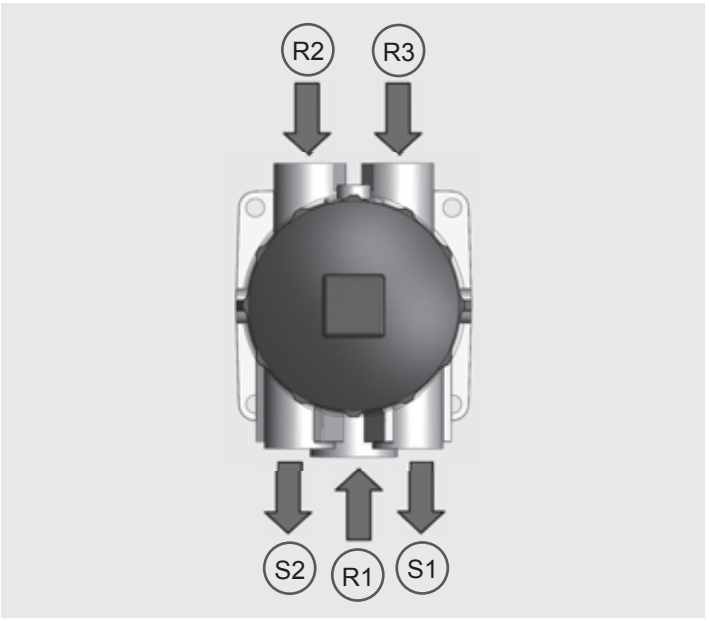
Example: RKM MM 100 BZZ 15 W 1.0 /-CBBCC



Port configuration RKM 151, 201, 251 Multiport

Position in code	1	2	3	4	5
Connection	R1	R2	R3	S1	S2
G ¾		(C)	(C)	C	C
G 1	D	D	D	(D)	(D)
G 1¼	(E)				
Port plugged	0	0	0	0	0
Special port	Z	Z	Z	Z	Z

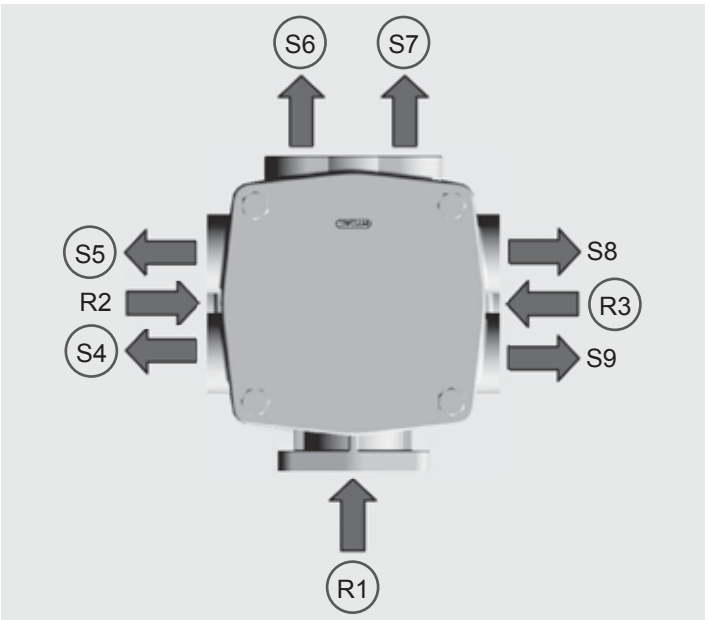
Example: RKM MM 201 BZZ 15 W 1.0 /-ECCDD



Port configuration RKM 400 and 800

Position in code	1	2	3	4	5	6	7	8	9
Connection	R1	R2	R3	S4	S5	S6	S7	S8	S9
SAE DN 50	(1)								
SAE DN 65	2								
1BSP		1	1	A	A	1	1	A	A
G1¼		2	(2)	B	B	(2)	(2)	B	B
G1½		3	3	(C)	(C)	3	3	C	C
Port plugged		(0)	0	0	0	0	0	(0)	(0)
Special port		Z	Z	Z	Z	Z	Z	Z	Z

Example: RKM MM 400 BZZ 15 A 1.0 /-102CC2200



2.5 PORT CONFIGURATION RKM 151, 201, 251 WITH THERMAL BYPASS VALVE

The part flow which requires cooling can be directed via separate ports via the thermal valve. During a cold start, the spool of the thermal valve shuts off the flow to the cooler so that the fluid flows directly through the filter element. The position of the spool is regulated by the oil temperature. From approx. 50-60 °C the inlet to the cooler is completely open (diagram 1).

Alternative connection option according to diagram 2: A hose connects the inlet line of the cooler to the thermal valve.

The connection configuration is determined by agreement with the customer.

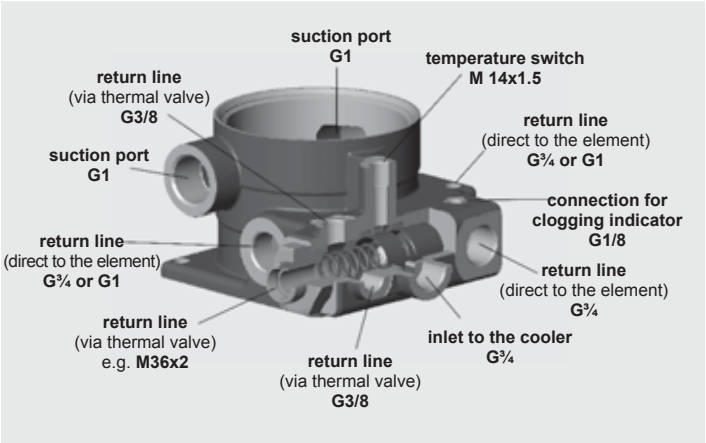


Diagram 1

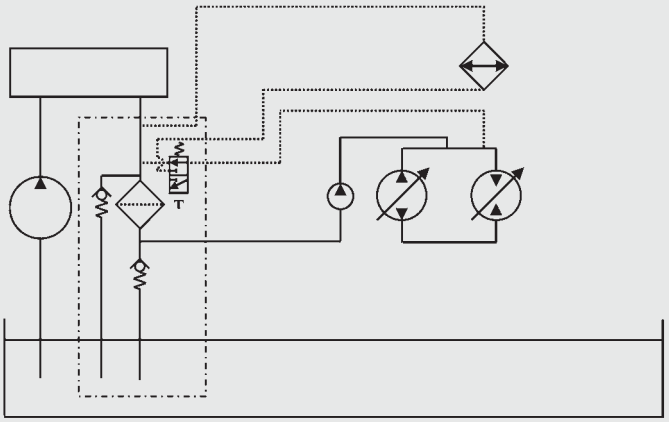
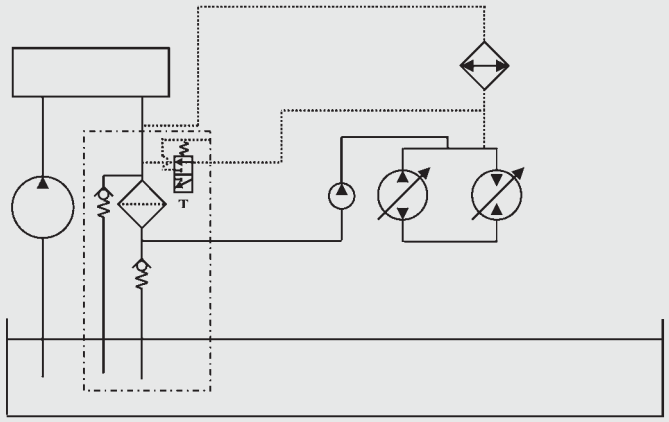
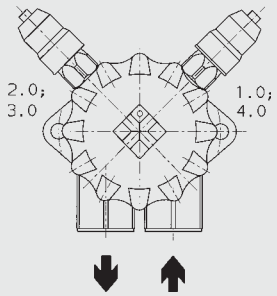


Diagram 2



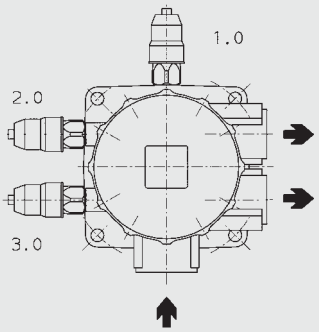
2.6 TYPE CODE

RKM 80, 100, 120



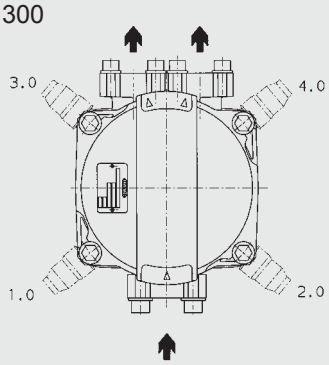
Type code	Mounting position of the clogging indicator	Type of clogging indicator	Measuring
1.X	On filter inlet, on right, at bottom	Return Line	Before filter element
2.X	On filter inlet, on left, at bottom	Return Line	Before filter element
3.X	On filter inlet, on right, at top	Vacuum	After filter element
4.X	On filter inlet, on left, at top	Vacuum	After filter element
5.X	Type code 1.X and 3.X	2 indicators: Return line & vacuum	Before & after element

RKM 151, 201, 251



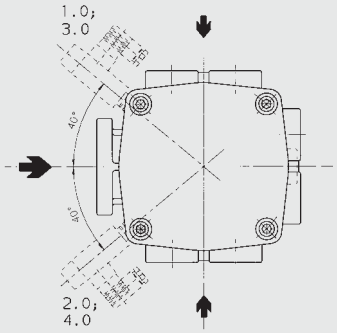
Type code	Mounting position of the clogging indicator	Type of clogging indicator	Measuring
1.X	Opposite filter inlet	Return line	Before filter element
2.X	On filter inlet, on left	Return Line	Before filter element
3.X	On filter inlet, on right	Vacuum	After filter element
5.X	Type code 1.X and 3.X	2 indicators: Return line & vacuum	Before & after element

RKM 300



Type code	Mounting position of the clogging indicator	Type of clogging indicator	Measuring
1.X	On filter inlet, on left	Return Line	Before filter element
2.X	On filter inlet, on right	Return line	Before filter element
3.X	On filter inlet, on left	Vacuum	After filter element
4.X	On filter inlet, on right	Vacuum	After filter element
5.X	Type code 1.X and 3.X	2 indicators: Return line & vacuum	Before & after element

RKM 400, 800

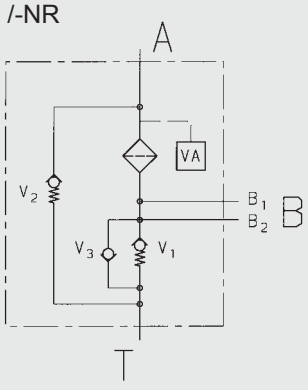


Type code	Mounting position of the clogging indicator	Type of clogging indicator	Measuring
1.X	On filter inlet, on left, at bottom	Return line	Before filter element
2.X	On filter inlet, on right, at bottom	Return line	Before filter element
3.X	On filter inlet, on left, at top	Vacuum	After filter element
4.X	On filter inlet, on right, at top	Vacuum	After filter element
5.X	Type code 1.X and 3.X	2 indicators: Return line & vacuum	Before & after element

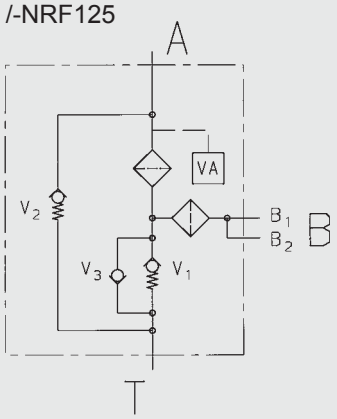
Other indicator configurations on request!

2.7 SYMBOLS

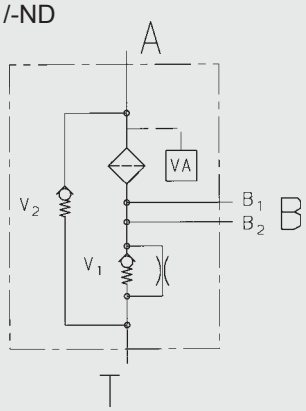
/-NR



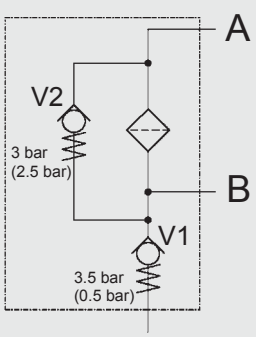
/-NRF125



/-ND



RKM 350



VA = clogging indicator

3. FILTER CALCULATION / SIZING

The total pressure drop of a filter at a certain flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = (see Point 3.1)

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$$

(*see point 3.2)

For ease of calculation, our Filter Sizing Program is available on request free of charge.

NEW: Sizing online at www.hydac.com

3.1 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

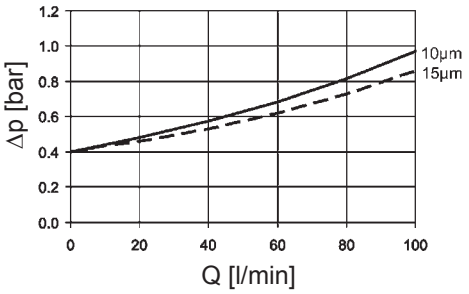
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

RKM	MM		
	8 µm	10 µm	15 µm
80	2.70	2.70	1.60
100	1.80	1.80	1.10
120	1.40	1.40	0.90
151	1.00	1.00	0.65
201	0.75	0.75	0.47
251	0.58	0.58	0.36
300	0.62	0.62	0.39
350	0.30	0.30	0.20
400	0.56	0.56	0.35
800	0.44	0.44	0.27

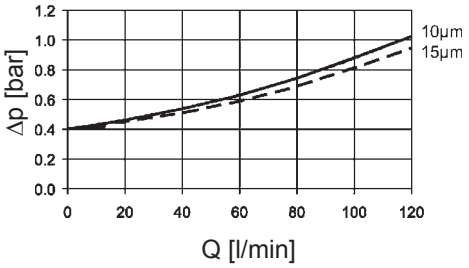
3.2 Δp-Q HOUSING CURVES INCLUDING ELEMENT BASED ON ISO 3968

The housing curves apply to mineral oil with a density of 0.86 kg/dm³ and a kinematic viscosity of 30mm²/s. In this case, the differential pressure changes proportionally to the density.

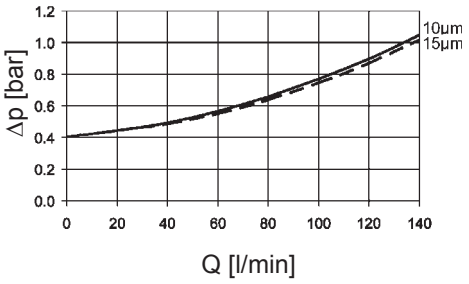
RKM 80



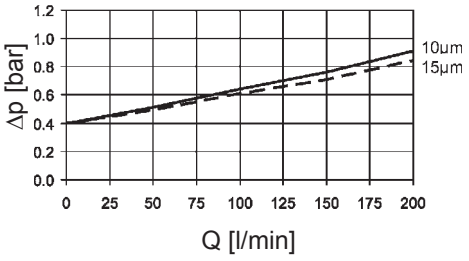
RKM 100



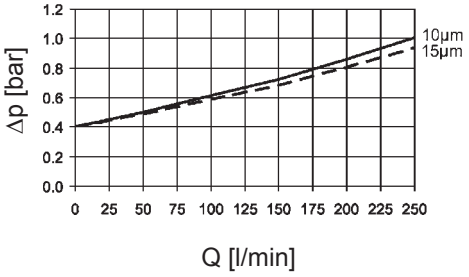
RKM 120



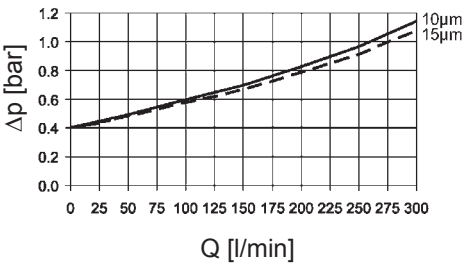
RKM 151



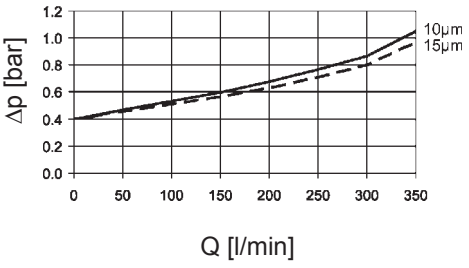
RKM 201



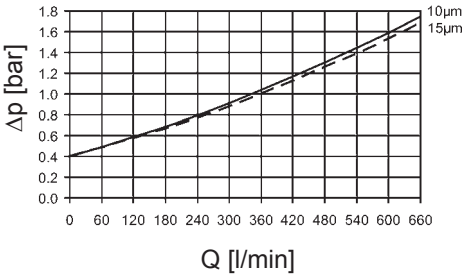
RKM 251



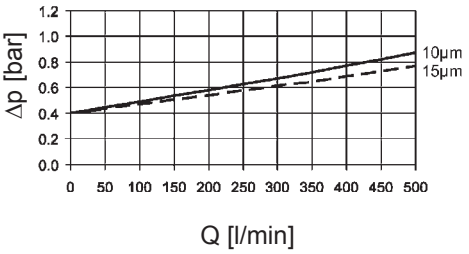
RKM 300



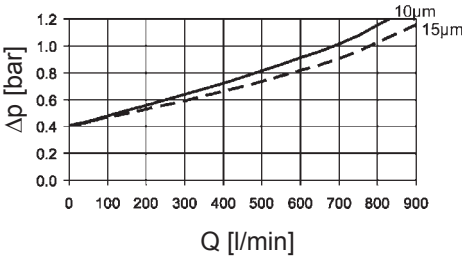
RKM 350



RKM 400

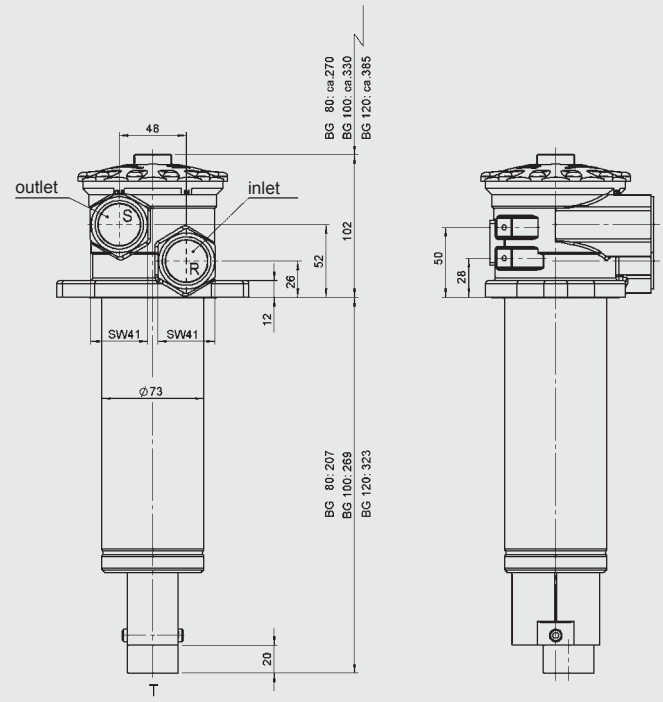


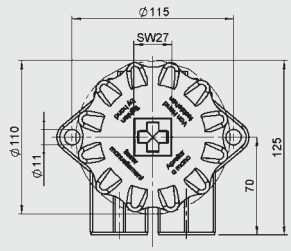
RKM 800



4. DIMENSIONS

RKM 80, 100, 120

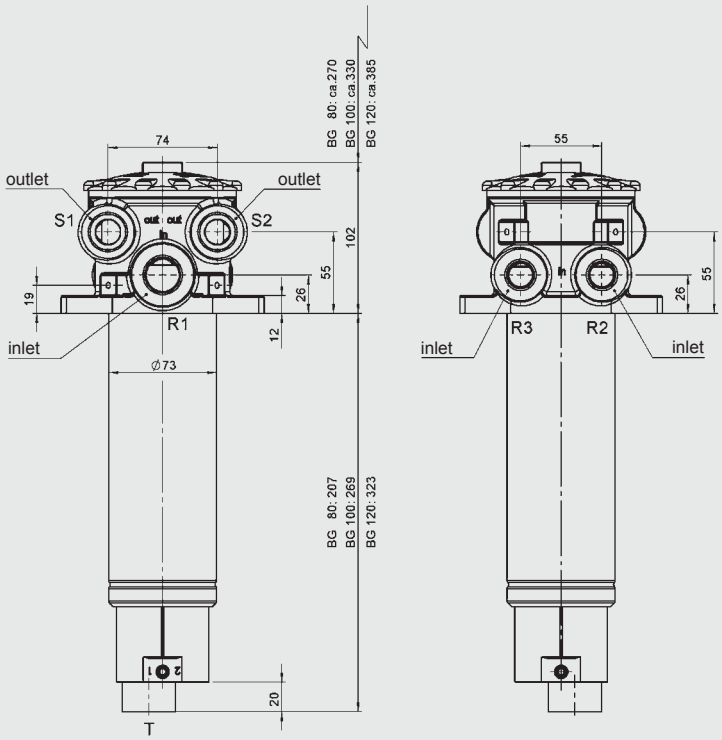


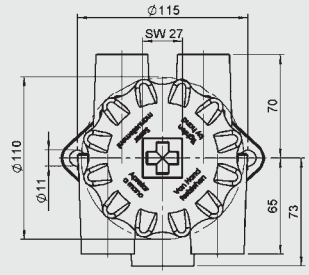


ca. = approx.
BG = size

	Weight incl. element [kg]	Volume of pressure chamber [l]
RKM 80	1.5	0.80
RKM 100	1.7	1.00
RKM 120	1.9	1.20

RKM 80, 100, 120 Multiport

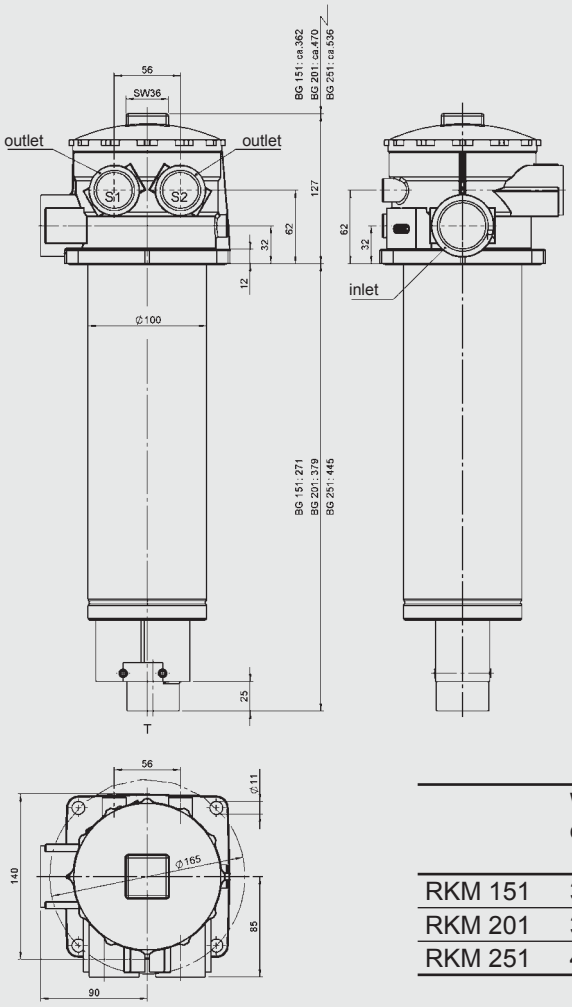




ca. = approx.
BG = size

	Weight incl. element [kg]	Volume of pressure chamber [l]
RKM 80	1.8	0.80
RKM 100	2.0	1.00
RKM 120	2.2	1.20

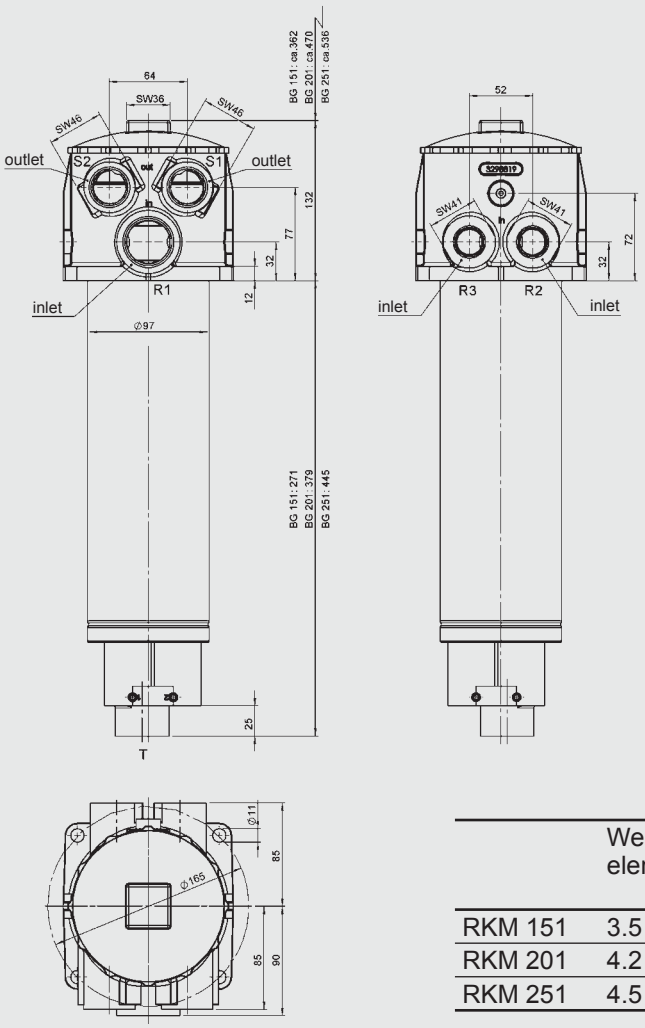
RKM 151, 201, 251



ca. = approx.
BG = size

	Weight incl. element [kg]	Volume of pressure chamber [l]
RKM 151	3.1	2.20
RKM 201	3.7	2.50
RKM 251	4.0	3.00

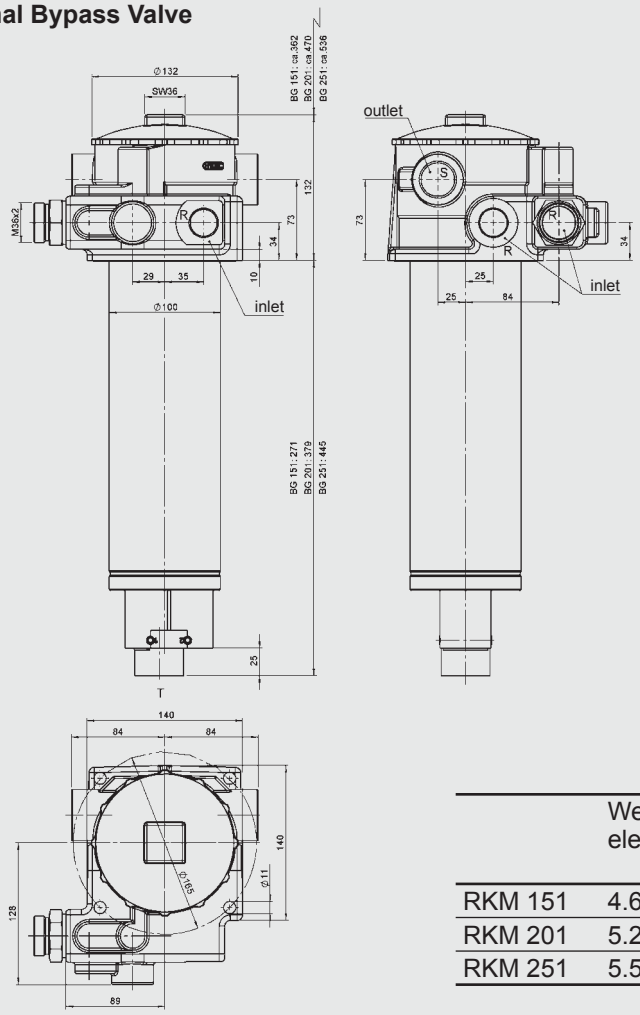
RKM 151, 201, 251 Multiport



ca. = approx.
BG = size

	Weight incl. element [kg]	Volume of pressure chamber [l]
RKM 151	3.5	2.20
RKM 201	4.2	2.50
RKM 251	4.5	3.00

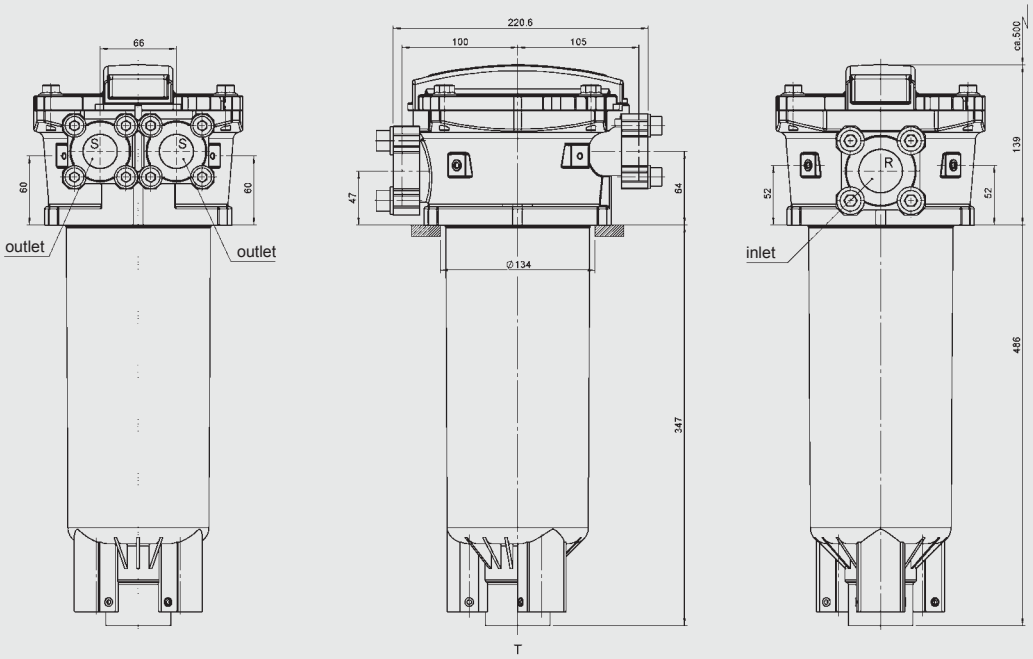
RKM 151, 201, 251 with Thermal Bypass Valve

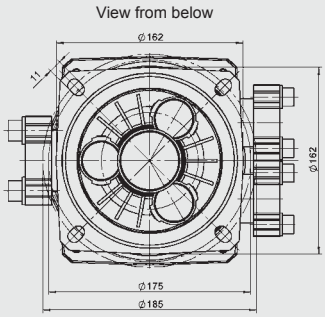


ca. = approx.
BG = size

	Weight incl. element [kg]	Volume of pressure chamber [l]
RKM 151	4.6	2.20
RKM 201	5.2	2.50
RKM 251	5.5	3.00

RKM 300

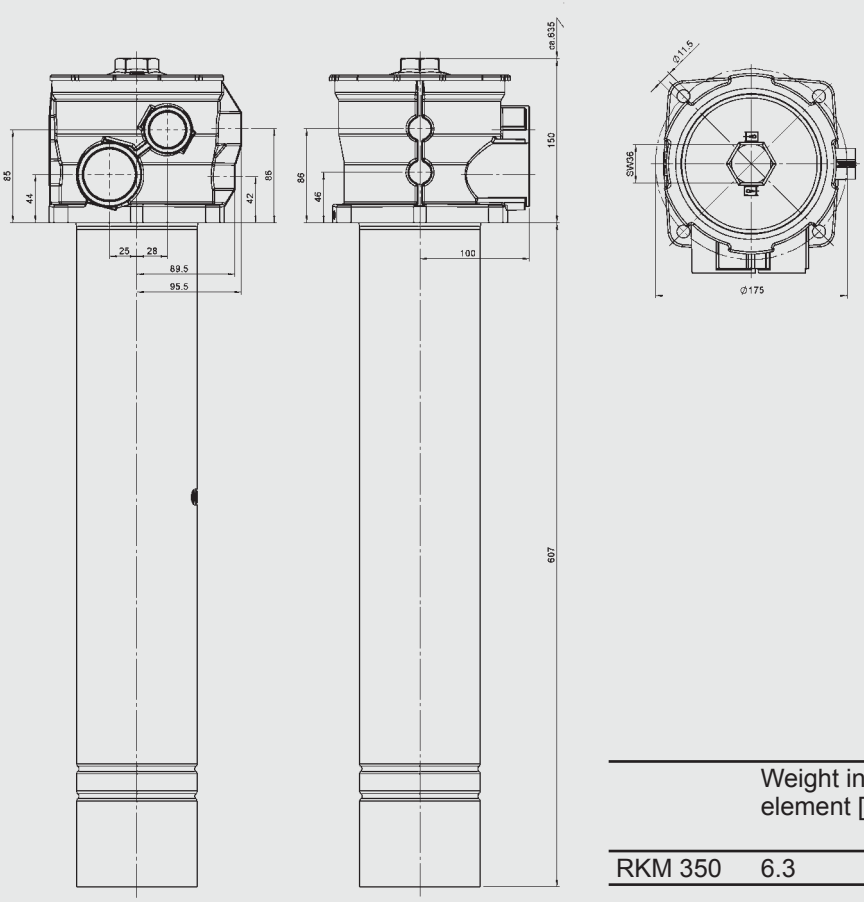




ca. = approx.
BG = size

	Weight incl. element [kg]	Volume of pressure chamber [l]
RKM 300	4.6	4.00

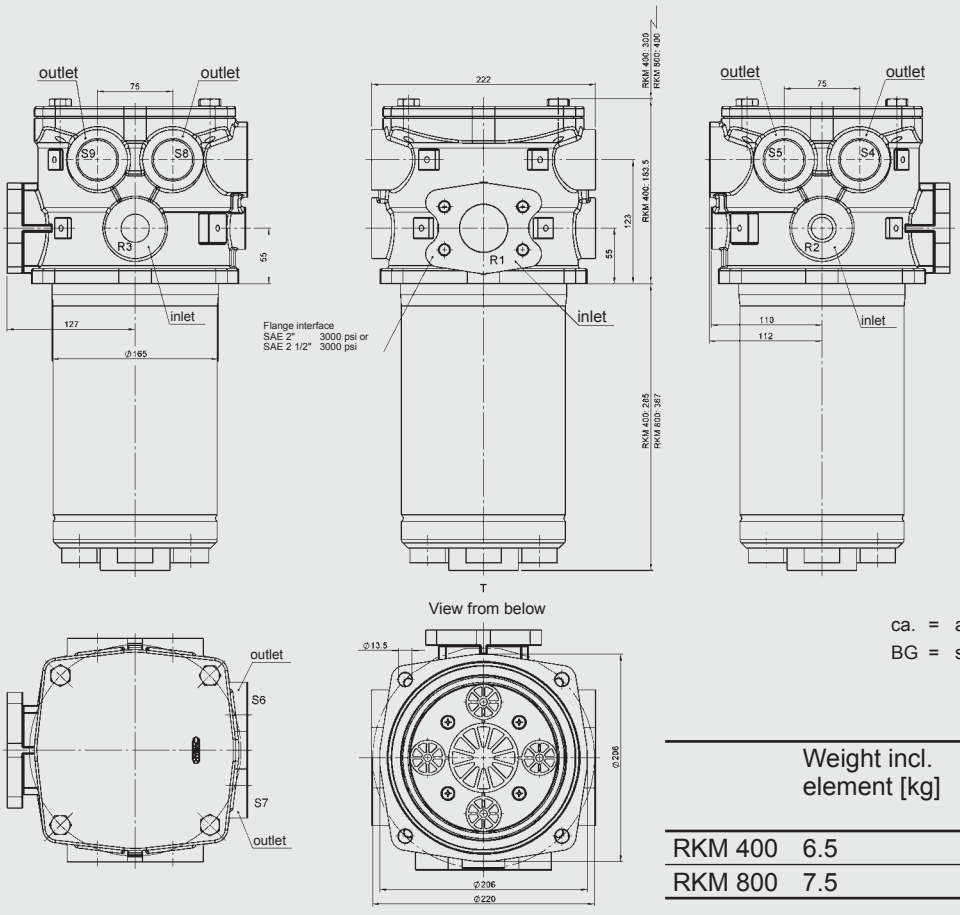
RKM 350



ca. = approx.
BG = size

	Weight incl. element [kg]	Volume of pressure chamber [l]
RKM 350	6.3	6.00

RKM 400, 800



ca. = approx.
BG = size

	Weight incl. element [kg]	Volume of pressure chamber [l]
RKM 400	6.5	8.50
RKM 800	7.5	10.00

NOTE

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

HYDAC FILTERTECHNIK GMBH
Industriegebiet
66280 Sulzbach/Saar, Germany
Tel.: 0 68 97 / 509-01
Fax: 0 68 97 / 509-300
Internet: www.hydac.com
E-mail: filter@hydac.com

Return Line
Suction Boost Filter RKM.
The New Generation.

Optimized for service. Optimized for efficiency. Quality protected.

RKM – New for Mobile:

Space saving

the need for at least
one filter is eliminated

Reduced maintenance costs

reduces maintenance
by at least half

First class component protection

excellent filtration efficiency
of the filter element which is
which is optimized for cold starts

Increased operating reliability

new High Efficiency
filter element technology

Warranty security

individual branding

The New Generation: The New Optimum.

First class pump protection
cavitation is reliably prevented

Flexible use
numerous connection options

Improved ease of maintenance
new design optimized for service

Long service life
high contamination retention

Guaranteed HYDAC quality
thanks to HYDAC Quality Protection

Your Professional Partner for Mobile Applications

With over 5,500 employees worldwide, HYDAC is one of the leading suppliers for fluid technology, hydraulic and electronic equipment.
With 40 overseas companies and over 500 sales and service partners we are a global player.

Our wide range of products, combined with our well-grounded expertise in all aspects of mobile machines, ensures HYDAC is qualified to be your professional partner for the mobile sector. Especially in the area of hydraulic filtration, you will benefit from decades of HYDAC experience and development successes.

Our quality and environment certification to ISO 9001/2000 and ISO 18001 denote first class quality and responsible management of our resources.

All from one supplier.

HYDAC will help find the solution for you!

From first class components right up to turnkey system solutions, from support during commissioning to maintenance and optimization, from professional filtration, to oil condition monitoring and expert cooling.

First class laboratory and testing expertise in the HYDAC Technical Centre

The new Technical Centre, specifically designed for filters and filter monitoring, is equipped with the most up-to-date instruments and test rigs. It offers a huge range of options for fluid analysis and filtration efficiency tests.

In our new laboratories, highly qualified staff are dedicated to continuously improving products and developing applications as well as carrying out analyses to customer specification – always tailored to the particular operating conditions.

In addition to the central facility at our headquarters there are further laboratories and mobile fluid laboratories in several HYDAC centres in Germany and overseas.

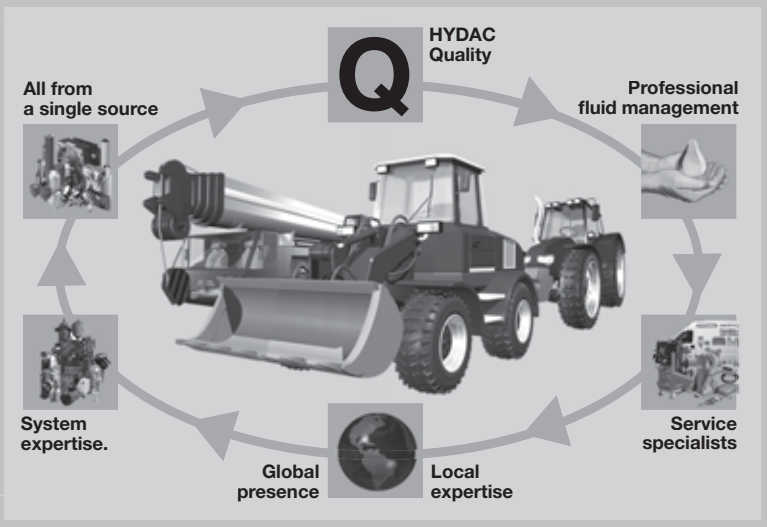
Just one example of the numerous filter testing procedures: **Multipass test rig.**

Oil analysis in the HYDAC laboratory at company headquarters.

With Us, You and Your Fluids are in the Safest Hands.

The specialists at HYDAC have a good knowledge of your fluid and welcome the opportunity to help you reduce the burden of fluid service. You will see for yourself the clear benefit of having a hydraulic or lubrication system that works perfectly, leaving you to concentrate fully on your area of expertise.

When you have decided on a HYDAC filter concept for your mobile machine, you are not "just" buying a filter, but you are also benefitting at the same time from the HYDAC network of expertise and service available worldwide:



Highest level of operating reliability for mobile applications.

In HYDAC you have a professional partner for all aspects of fluid cleanliness

This product overview shows just a single filter type. The whole filter range from HYDAC covers approximately fifty other types – the majority of which have been developed for mobile applications.

In addition, new individual solutions are constantly being developed, partly in active development partnership with the manufacturers.

HYDAC filters offer you the following advantages.

Low costs
the filter elements and housings are optimized for the mobile sector

Easy maintenance
simple element change and easy-to-install filter housing

High level of operating reliability
filter media have high filtration efficiency for exceptional cleanliness classes and benefit from a high level of production quality

Low operating costs
particularly low pressure drops across filter and filter element for low energy consumption

All components and systems from one company
providing comprehensive system know-how and integrated system approach

Worldwide availability and advice
provided by our worldwide network of regional offices, agents and service partners

Protection of the spare part business
thanks to special features such as "Brand Labelling" and "Quality Protection"

HYDAC Return Line Suction Boost Filter RKM.

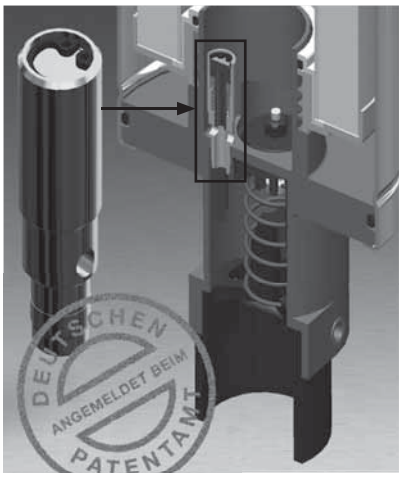
Filter housing optimized for service.

Never before has the RKM been so easy to service:
The element is, as previously, lifted with the filter bowl out of the tank-mounted head of the filter.
What's new is that the element is now firmly screwed **to the bowl**.
It will not become loose and can be lifted out smoothly. In addition, the convenient removal handle makes for a clean and easy element change.

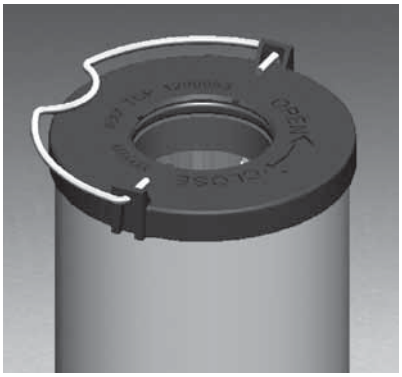
Special advantage: the optional patented oil drain valve opens automatically to the tank when the filter cover plate is opened.

Customer benefits of the new generation:

- **Improved ease of maintenance no risk of injury**
since the element is securely attached to bowl and a convenient removal handle is provided
- **Cleaner element change**
element firmly attached to bowl and automatic oil drain valve available (as an option)



Patented oil drain valve.


Element with removal handle.

Filter elements optimized for efficiency.

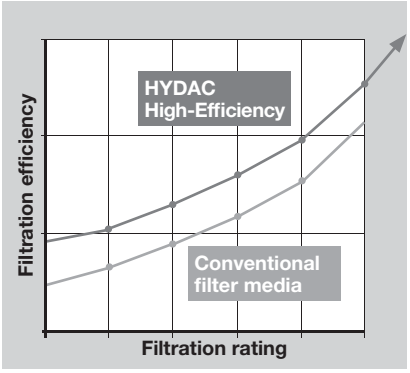
In the Return Line & Suction Boost Filter RKM special "Mobilemicron" filter elements have always been used which have an exceptionally good pressure drop characteristic.
In other words, for the same ambient conditions and flow rate, Mobilemicron elements produce significantly lower Δp than comparable hydraulic elements.

For the new generation we have gone one better: **Mobilemicron elements in a High-Efficiency version** achieve particularly high separation rates. That means **still greater efficiency** for these already highly efficient Mobilemicron filter elements.

Customer benefits of the new generation:

- **Excellent component protection and increased machine availability**
due to the outstanding filtration efficiency of the new High Efficiency elements
- **Protection of the shaft seals of the hydrostatic drive**
particularly low pressure drop across the element (especially during cold start)


Mobilemicron filter elements.



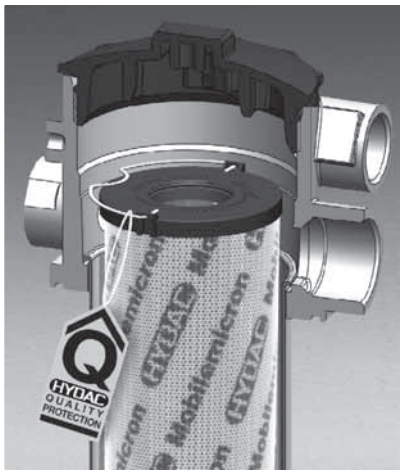
High-Efficiency graph.

Quality Protection

The new RKM is equipped with a "Quality Protection solution". The anti-copying measures built into the top quality original elements prevent counterfeit elements being fitted.
In addition, the RKM elements can of course be overprinted as usual with your company logo (Brand Labelling).
Overprinting also supports the exclusive use of original elements.

Customer benefits of the new generation:

- **Outstanding quality of the replacement element**
and with that, long service life of element and components, guaranteed cleanliness and high level of operating reliability
- **Safeguarding of the spare parts business**
particularly for OEMs
- **Guaranteed spare part quality**
and therefore oil cleanliness in respect of warranty claims



Quality Protection. (Integrated anti-copying design)


Brand Labelling. (Element with customer logo)

E 7.124.0/03.12

The New Generation: Optimized for Service.

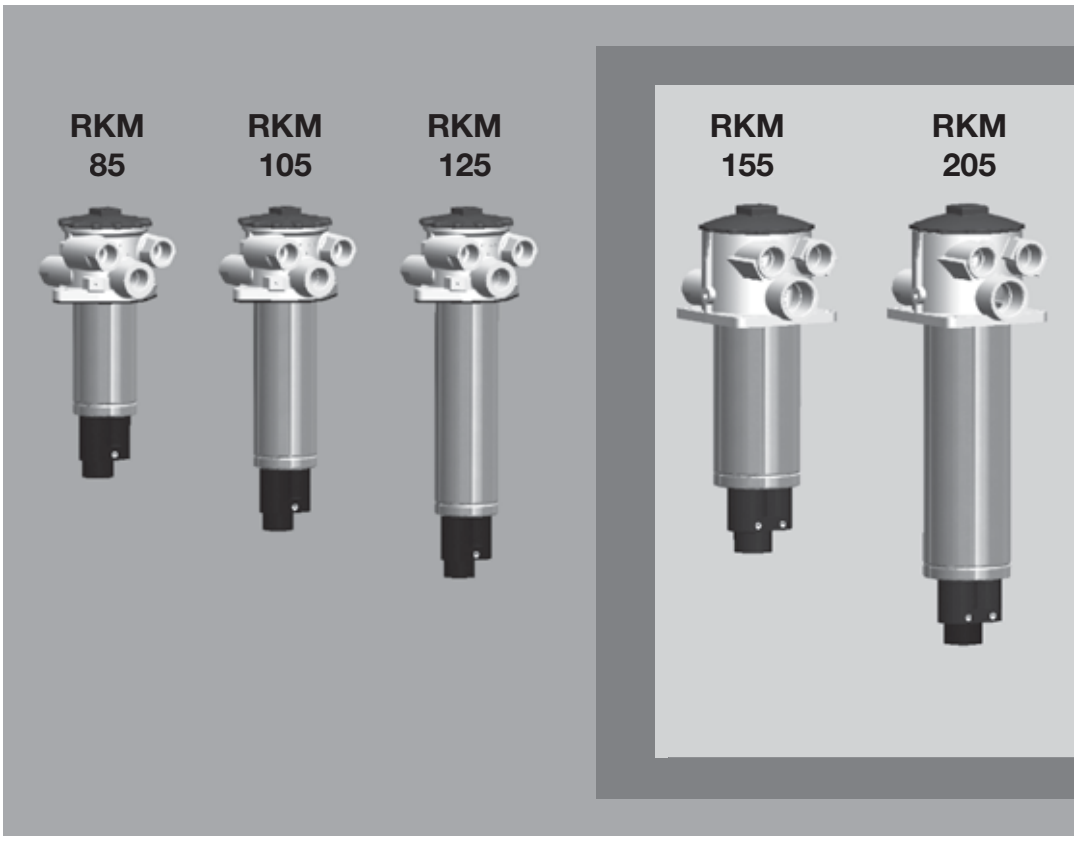
A filter crammed with cutting-edge technology.

The new RKM has not only been optimized in terms of service, efficiency and quality, but it also triumphs in terms of other beneficial refinements.

On this double page you will see the choice of possible RKM configurations. Each of the versions illustrated is the result of a specific customized solution. In other words, these are not "off the shelf" products but have developed from specific requests from the mobile sector.

The result is a range with matchless flexibility and a wealth of ideas. Further details can be found in the current brochure no. 7.108.2.

Needless to say, with the varied RKM standard range as your starting point, there is always the option of developing new RKM solutions individually tailored to your application and requirement profile. Please view this selection as a "appetizer" and let us know what solutions you are seeking.



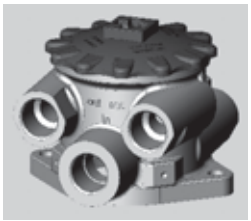
RKM 85 – 255 and 405 – 805 Variety of connections with "RKM Multiport".

Almost all RKM sizes are available with a Multiport filter head. The huge number of possible combinations of return line and suction boost connections and the different port positions means that the filter can be quickly configured to suit individual customers.

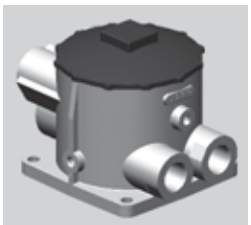
For sizes 405 and 805 there are for example nearly 200,000 (!) versions available (see table below).

Particular advantages of having variety of connections:

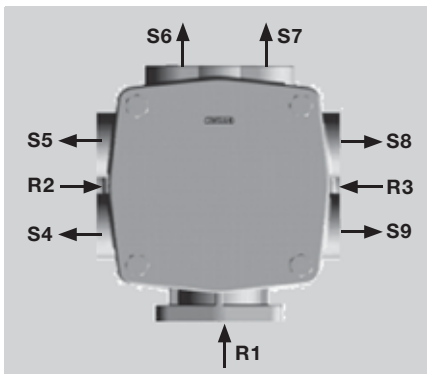
- **Space and cost saving**
- **Reduction in components**
  Need for blocks, hoses and threaded connections is eliminated
- **Reduced risk of leakage**
- **Great flexibility**



Head of RKM 85 - 125 Multiport.



Head of RKM 155 - 255 Multiport.



Variety of connections with **RKM Multiport.**

	Return lines			Suction lines					
Connection	R1	R2	R3	S4	S5	S6	S7	S8	S9
SAE DN 50	✓	×	×	×	×	×	×	×	×
SAE DN 65	✓	×	×	×	×	×	×	×	×
G 1	×	✓	✓	✓	✓	✓	✓	✓	✓
G 1¼	×	✓	✓	✓	✓	✓	✓	✓	✓
G 1½	×	✓	✓	✓	✓	✓	✓	✓	✓

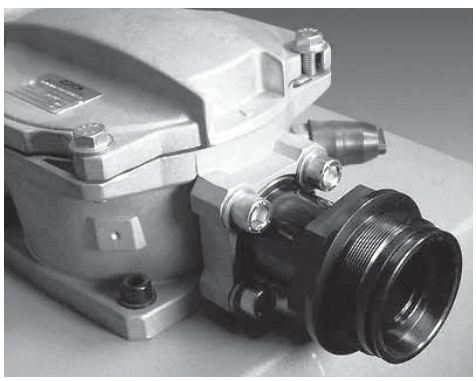
Connection options for return lines and suction lines.

RKM 155 – 305 with Cost-Saving connection "CS".

The patented CS connection is designed to speed up and simplify the mounting of hoses by using just four screws supplied with the filter.

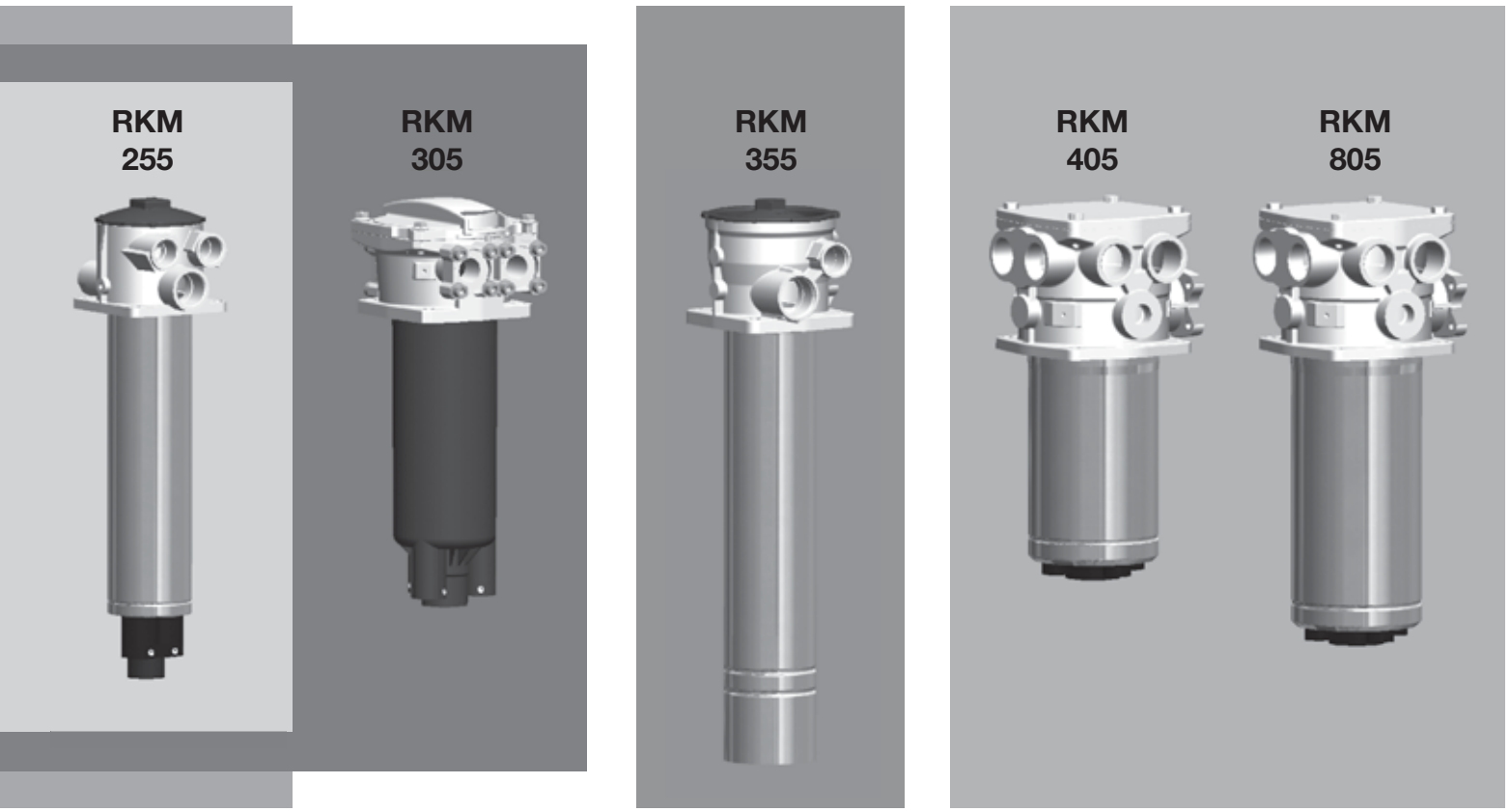
Particular advantages of this version:

- **Simplified installation**
  Whereas in the case of conventional SAE flanges four screws, four washers and two installation fittings are required per hose connection, the CS connection does not require any other additional installation fitting.
- **Improved cold start performance**
  compared to standard threaded connections, due to lower pressure drop on suction side.



Advantageous **Cost-Saving connection.**

Optimized for efficiency. Quality protected.

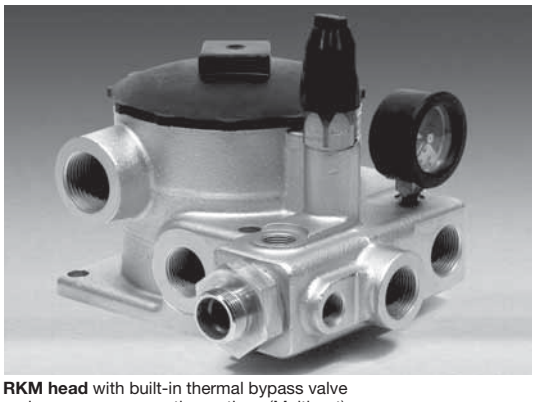


RKM 155 – 255 with thermal bypass valve

For the RKM 155 - 255, a temperature controlled cooler bypass valve can be built directly into the filter head, on request. This "intelligent" valve varies the volume of the fluid to be cooled depending on the temperature of the operating fluid.

Particular advantages of this version:

- **Enhanced protection of the shaft seals during cold start**
  because the built-in temperature-controlled valve provides huge savings in Δp, particularly compared to externally piped cooler bypass valves which use check valves. Also in comparison to externally piped thermal valves, significant improvements in Δp are achieved.
- **Drastically reduced time and effort for installation (Plug & Play),**
  because the complete package is supplied ready-to-install (reduction in components) and the need for blocks and fittings is largely eliminated.



RKM head with built-in thermal bypass valve and numerous connection options (Multiport).

RKM 355 with cooler bypass valve.

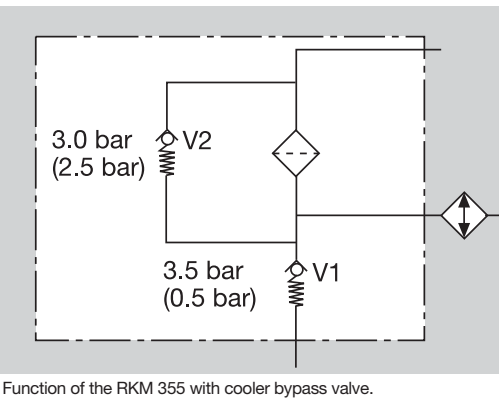
The valve "V1" is used here as a cooler bypass valve.

It protects the cooler from excessive pressures. If the back pressure increases at the cooler during cold start, the valve opens and part of the flow drains directly to the tank.

In order to ensure full flow cooling, the element bypass valve discharges to the cooler.

Particular advantages of this version:

- **Space and cost saving**
  Cooler bypass valve built into the filter
- **Increased operating safety**
  Cooler always supplied with finely filtered oil
- **Pressure protection of the cooler**



Function of the RKM 355 with cooler bypass valve.

HYDAC RKM: Two Filters in One.

A design that saves money.

By using a HYDAC Return Line & Suction Boost Filter RKM you will benefit from:

Space saving
Just one filter required instead of two

Easy maintenance
Half the time required for installation and maintenance

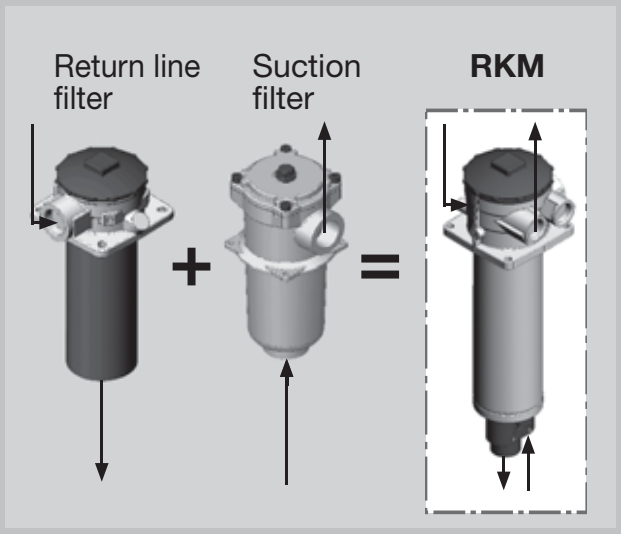
Cost saving
Lower investment, storage and service costs

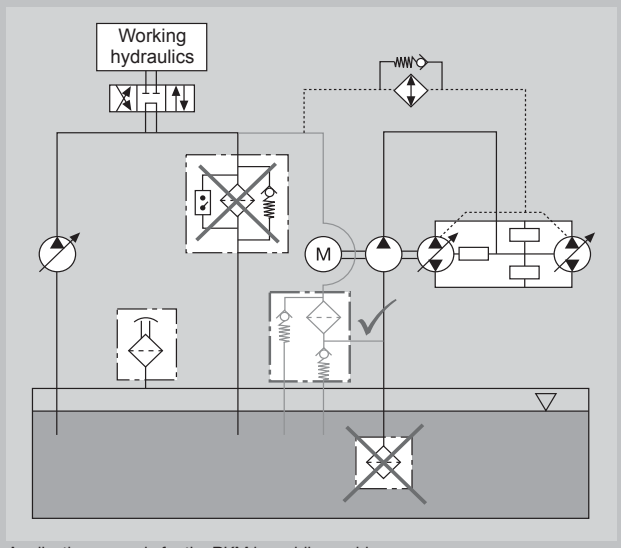
Increased operating safety
Cavitation at the pump is reliably prevented and finely filtered oil is supplied even in the suction line.

One filter. Two functions. All the advantages.

The RKM combines the advantages of a return line filter with those of a suction filter in a single filter!

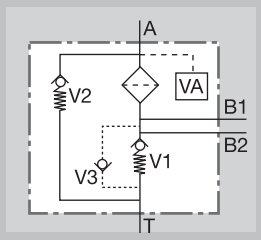
Return line & suction boost filters are particularly suitable for use in machines with two or more circuits, such as for example in mobile working machines with hydrostatic traction drives (wheel loaders, forklifts).





Application example for the RKM in mobile machines.

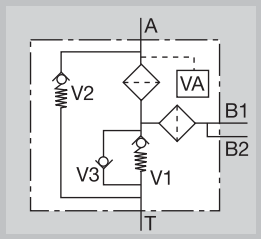
Function.



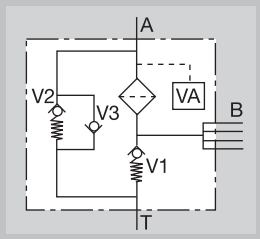
The return line flow Q_R is supplied to the element via one or more inlets "A". Once the element has been subjected to flow from the outside to the inside, the back-pressure valve "V1" in the element builds 0.5 bar positive pressure. Particularly in cold start this positive pressure supports the suction characteristics of the pump(s) connected to "B" (e.g. boost pumps). This considerably reduces the risk of cavitation.

Ensure that the return line volume in operating conditions is always greater than the volume which is supplied on the suction side. The surplus volume drains to tank via "T". The bypass valve "V2" is fitted to relieve excessive back-pressure.
Part of the flow then drains directly to tank, bypassing the element. This configuration of valves ensures that only finely filtered oil reaches the suction port during operation*. The gradual increase of the valve characteristics contributes to keeping the back pressure in the return lines sufficiently low, even with high viscosity levels.
With optional valve "V3", oil can be drawn from the tank for short periods*, e.g. for initial filling and for venting.

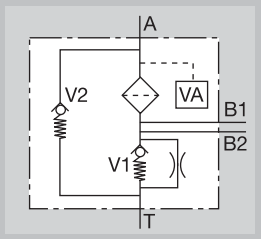
Further options:



Anti-cavitation valve* with coarse filter strainer
for filtered oil also in anti-cavitation mode

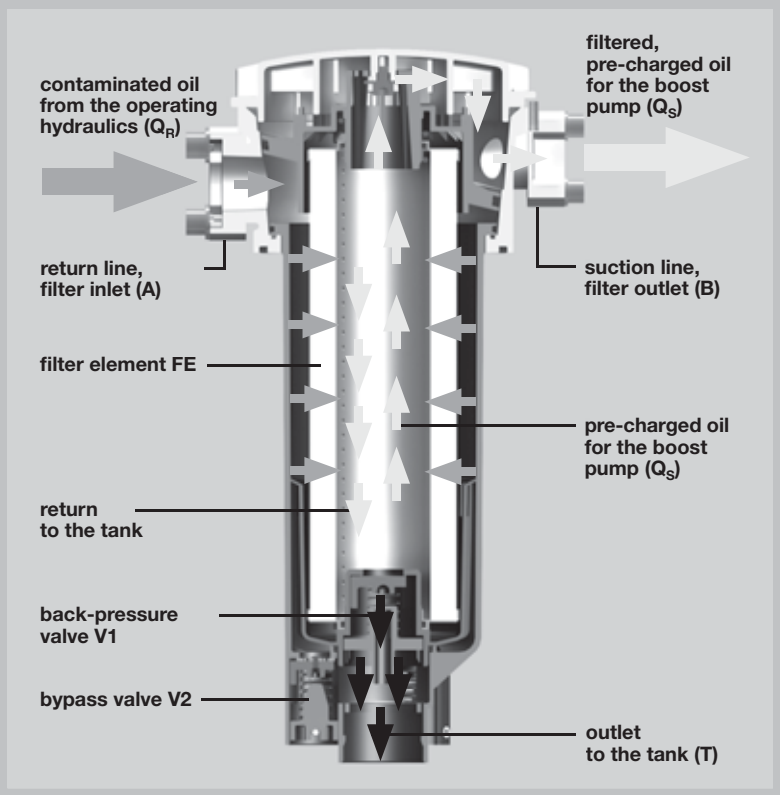


Anti-cavitation valve* in the element bypass valve "V2"
for finely filtered oil also in anti-cavitation mode



Throttle in back-pressure valve "V1"
for reducing pressure and draining oil

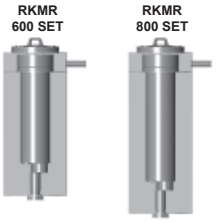
*not for RKM 355
VA = clogging indicator



Function of the RKM.

Return Line Suction Filter RKMR

Element flow direction from in to out
In-tank versions:
up to 800 l/min, up to 10 bar



1. TECHNICAL SPECIFICATIONS

1.1 FILTER HOUSING

Construction

The filter housings are designed in accordance with international regulations. They consist of a filter cover plate and an element location spigot. The element is top-removable.

Standard equipment:

- with bypass valve
- magnetic core built into cover plate

1.2 FILTER ELEMENTS

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

- ISO 2941
- ISO 2942
- ISO 2943
- ISO 3724
- ISO 3968
- ISO 11170
- ISO 16889

Contamination retention capacities in g

	Glass fibre (ULP)		
RKMR-KIT	5 µm	10 µm	25 µm
600	85	153	170
800	115	207	230

	Glass fibre with pre-filter (UHC)		
RKMR-KIT	5 µm	10 µm	20 µm
600	272	408	459
800	368	552	621

Filter elements are available with the following pressure stability values:

Glass fibre (ULP): 6 bar

Glass fibre with pre-filter (UHC): 6 bar

1.3 FILTER SPECIFICATIONS

Nominal pressure	up to 10 bar
Temperature range	-30 °C to +120 °C
Material of housing tube	Steel
Material of cover plate	EN-GJS-500
Bypass cracking pressure	3 bar (others on request)

1.4 SEALS

NBR (= Perbunan)

1.5 INSTALLATION

In-tank filter

1.6 SPECIAL MODELS AND ACCESSORIES

- without magnetic core
- air bleed valve in cover plate
- protective strainer for bypass and anti-cavitation valve

1.7 SPARE PARTS

See Original Spare Parts List

1.8 CERTIFICATES AND APPROVALS

Test certificate 2.2

Other approvals on request

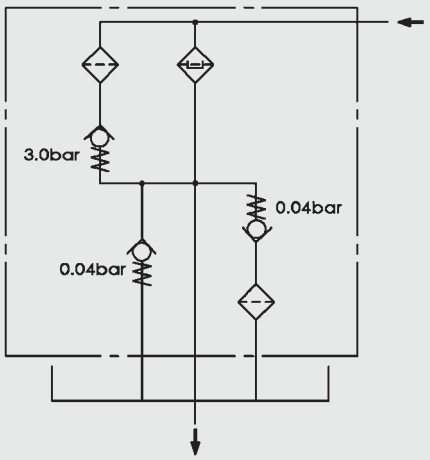
1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

1.10 IMPORTANT INFORMATION

- Filter housings must be earthed.
- When using electrical clogging indicators, the electrical power supply to the system must be switched off before removing the clogging indicator connector.

Symbol for hydraulic systems



2. MODEL CODE (also order example)

RKMR ULP 800 KIT 10 W 1 . X /-V

2.1 COMPLETE FILTER

Filter type
RKMR

Filter material of element
ULP Glass fibre
UHC Glass fibre with pre-filter

Size of filter or element
RKMR: 600, 800

In-tank version
KIT filter cover plate and element spigot only

Filtration rating in µm
ULP : 5, 10, 25
UHC : 5, 10, 20

Type of clogging indicator
W without port, no clogging indicator

Type code
1

Modification number
X the latest version is always supplied

Supplementary details
no details = standard bypass cracking pressure B3 = 3 bar
B. special bypass cracking pressure
V FPM seals
OM without magnetic core
NRF protective strainer for anti-cavitation valve
BRF protective strainer for bypass valve

2.2 REPLACEMENT ELEMENT

0800 R 010 ULP /-V

Size
0600, 0800

Type
R

Filtration rating in µm
ULP : 005, 010, 025
UHC : 005, 010, 020

Filter material
ULP, UHC

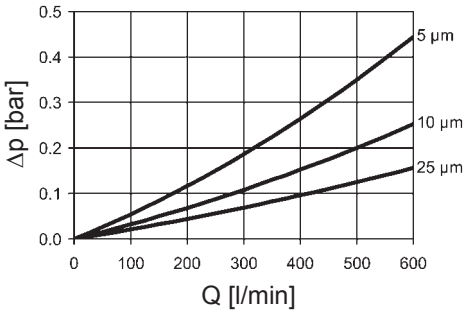
Supplementary details
V (for descriptions, see point 2.1)

3. FILTER CALCULATION / SIZING

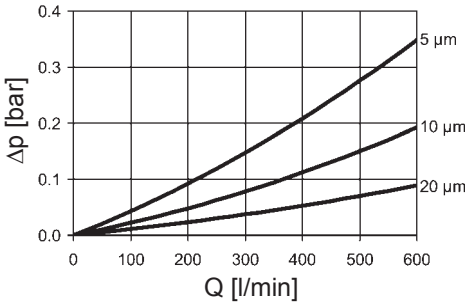
3.1 GRAPHS FOR COMPLETE FILTER

The curves for complete filters apply to mineral oil with a density of 0.86 kg/dm³ and a kinematic viscosity of 30mm²/s.

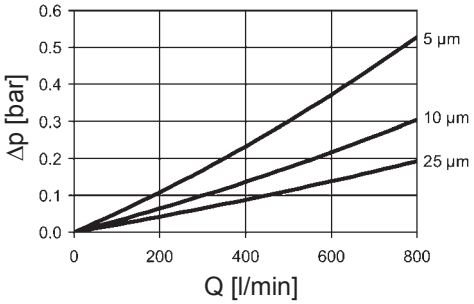
RKMR 600 KIT: ULP



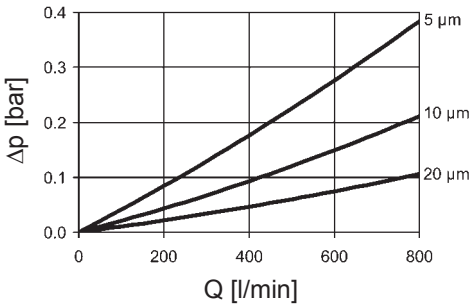
RKMR 600 KIT: UHC



RKMR 800 KIT: ULP

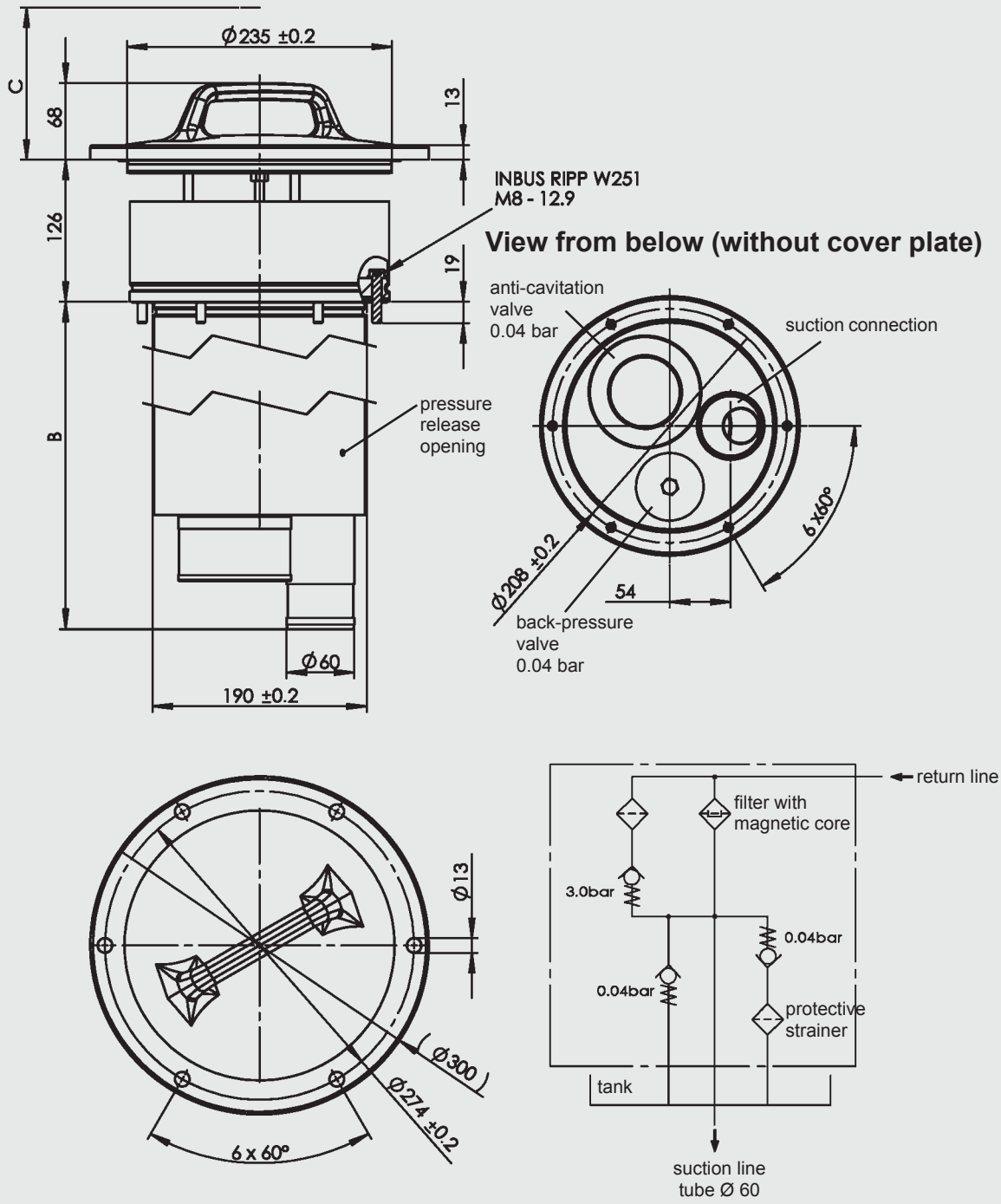


RKMR 800 KIT: UHC



4. DIMENSIONS

RKMR 600 - 800 KIT



RKMR KIT	B	C min.	Weight incl. element [kg]
600	695	570	29.4
800	807	685	32.4

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 FILTERTECHNIK GMBH
Industriegebiet
D-66280 Sulzbach/Saar, Germany
Tel.: 0 68 97 / 509-01
Fax: 0 68 97 / 509-300
Internet: www.hydac.com
E-mail: filter@hydac.com