MANN+HUMMEL Filters for Liquids

MANN+HUMMEL

MANN+HUMMEL Industrial Filters

The MANN+HUMMEL Group is an international company with its headquarters in Ludwigsburg, Germany. The group employs more than 10,000 people worldwide at more than 41 locations.

The company develops, produces and sells technically complex components and systems for the automotive industry and many other fields. A key area is high quality filtration products for vehicles, engines and industrial applications. The OEM business with global market leaders and producers of vehicles, machines and installations defines the quality and performance of the products. Filters for the international aftermarket are sold under a variety of international brands as well as under the MANN-FILTER brand.

MANN+HUMMEL Industrial Filters

The Industrial Filters Business Unit has its headquarters in Speyer, Germany. The business unit is specialized in meeting the special requirements of off-highway vehicles and engine applications, compressed air and vacuum technology, mechanical engineering and plant construction.

MANN+HUMMEL Industrial Filters offers high performance for these fields and other fields which have a requirement for the filtration and separation of air, gas and liquids.

Liquid filters for many applications

Modern, high-performance vehicles, machines, equipment and engines require filters and components with a corresponding performance. This catalogue provides an overview of our filters for liquids and the matching accessories, naturally all in the standard MANN+HUMMEL OEM quality.

Our customers come from many varied fields such as:

- Construction machines
- Agricultural machines
- Compressors
- Mechanical engineering
- Engine and drive systems
- Commercial and special vehicles, etc.,

This extensive experience enables MANN+HUMMEL to offer individual concepts and solutions for special customer requirements.

Also near to you

Our production facilities and sales offices at a number of European locations, in the USA, South America and in Asia enable the analysis of technical questions on site. One of our subsidiary companies or representatives is also sure to be near to you to enable easy contact.

How to find your contact partner:

In order to establish your contact partner at MANN+HUMMEL or make contact with one of our representatives, just call

Tel.: +49 (62 32) 53-80
Fax: +49 (62 32) 53-88 99

and tell us your area of operations. We will then immediately put you in contact with one of our specialised sales teams.

You can find us in the internet at:
www.mann-hummel.com
E-Mail: if.info@mann-hummel.com

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Product overview

Spin-on filters

W type **Page 10-12**

Spin-on filters as full-flow filters are used for the filtration of oil. The raw oil flows in through the outside holes in the cover plate of the filter and leaves again through the central thread. Depending on the requirements, the spin-on filters are equipped with bypass valves, non-return valves, ascending pipes or similar.

WP type **Page 14**

Partial-flow filters or a combination of full-flow and partial-flow filters as a spin-on filter. The dirty oil flows in through the outer holes in the filter mounting plate. In the filter the oil flow is divided into a full and partial flow and then leaves on the filtered side with different degrees of filtration fineness.

WD, WH type **Page 12+13**

Spin-on filters similar to the W type but designed for higher operating pressures.

WK type **Page 60+61**

Spin-on filters similar to the W types but mainly used for fuel filtration.

WDK type **Page 60+61**

Spin-on filters similar to the WK type but designed for higher operating pressures.

PL type **Page 69**

Spin-on filter for the PreLine® preliminary fuel filter.

Product overview

In-line filters

W, WD type **Page 20-31**

WK, WDK type **Page 70-74**

Spin-on filters for use with in-line filters with filter heads.

Overview of oil filter heads **Page 18+19**

Overview of fuel filter heads **Page 66+67**

Filter elements

7890

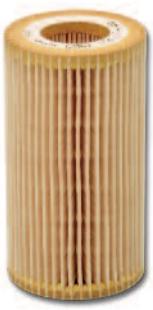
These are metal-free and especially environmentally-friendly fuel filter elements mainly used with in-line injection pumps. For multi-stage filters the BFU type is always used as a preliminary filter.

H type **Page 33-35**

Housing filter elements only for use in the full flow of the liquid.

HU type **Page 39**

Especially environmentally-friendly metal-free oil filter elements.



HD type **Page 36-38**

Oil filter elements for higher pressures, especially suitable for hydraulic applications.

P type **Page 77**

Mainly used for the fine filtration of fuel.

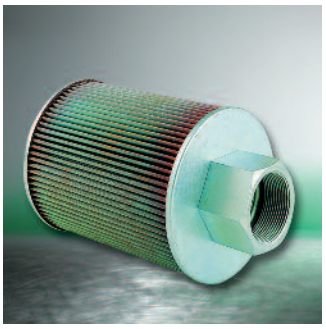
PF type **Page 40**

Mainly used for filtration of the partial oil flow.

Product overview

Strainer filters **Page 41**

Strainer filters are used as a cost-effective solution for the pre-filtration of liquids or as a protection filter. They have a low flow resistance and filter liquids through particle separation on the strainer surface.

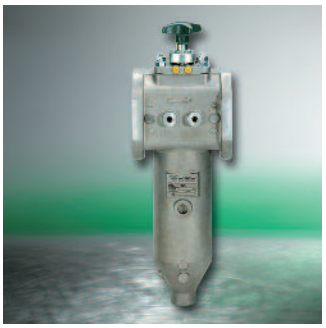


Centrifuges **Page 45**

Centrifuges have an external housing cover and a central spindle around which a rotor turns at high speed. The resulting centrifugal force serves to separate the finest particles (soot) from the lube oil. Centrifuges are partial-flow filters and are operated in combination with a full-flow filter.

Gap-type filters **Page 79**

Gap-type filters always find application when coarse particles have to be separated from heavily contaminated liquids. These are surface-type filters. During normal operation a filter cake forms which is cleaned away manually or with the support of a motor.



MANN+HUMMEL Spin-on oil filters

MANN+HUMMEL Spin-on oil filters

MANN+HUMMEL spin-on filters are used for the filtration of lube oils, hydraulic oils and coolants in a variety of applications. MANN+HUMMEL has been a leading producer worldwide of spin-on filters for more than twenty years. The filters are distributed under the MANN-FILTER brand and a number of customer brands.

The advantages at a glance:

- Available with a variety of filter media
- Efficient separation and high dirt holding capacity with minimal pressure drop
- Robust, corrosion-protected housing with high pulsation and pressure stability
- Improved flow geometry
- Bypass valves with clearly-defined opening characteristics and leak-free closing
- Undetachable seals
- Stable central tube resistant to collapse
- Non-return valve with minimal pressure drop

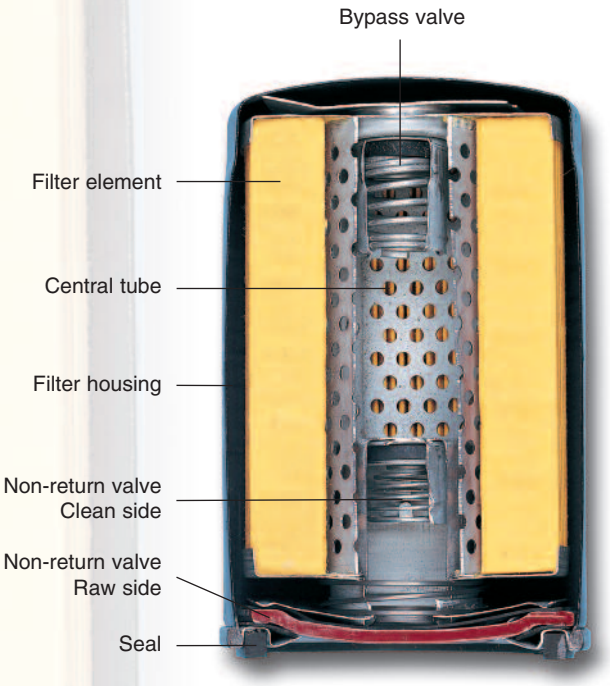
Design

The spin-on filter consists of a robust metal housing with a filter element fitted inside. Depending on the application, the spin-on filter can be equipped with various components such as a different filter medium, a non-return valve, a bypass valve, etc.. The liquid to be filtered flows into the cover plate through concentric openings, flows through the filter element and finally the cleaned liquid exits through the central connection. An undetachable seal integrated in the cover plate ensures optimum sealing to the outside under all operating conditions.

Maintenance

The time for maintenance is usually defined by the engine or machine manufacturer. Maintenance simply requires replacement of the complete spin-on filter. The spin-on filter can easily be removed using a MANN+HUMMEL filter wrench (see page 88).

Cross-section picture



MANN+HUMMEL Spin-on oil filters

Oil filters

The W and WD type MANN+HUMMEL spin-on filters are mostly used for the filtration of oil as full-flow filters, whereby the complete flow of oil flows through the filter. As an option, a bypass valve can be fitted which opens for cold starts to ensure there is always an adequate flow of oil.

On request an integrated non-return valve on the raw and clean sides prevents emptying of the spin-on filter when the engine is not in operation. Thus when the engine starts the lube oil reaches the lubrication points more quickly.

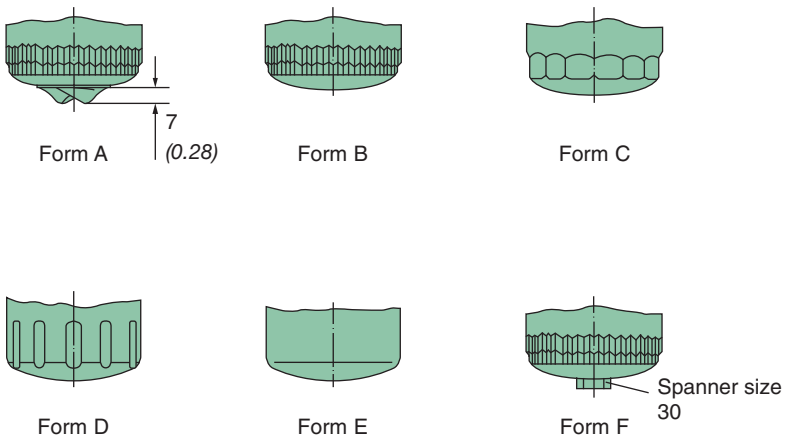
Partial-flow filter

The WP type partial-flow filter is a spin-on filter from MANN+HUMMEL fitted with a very fine medium. The amount of fine particles in the oil is reduced leading to less engine wear. At the same time there is a positive influence on the pumping characteristics of the oil.

In addition to partial-flow filters the MANN+HUMMEL product range also includes a combination of a full-flow/ partial-flow filters (WP type, see page 14).

Types of spin-on filters

The dimension tables refer to these forms.



W type

Oil full-flow filters

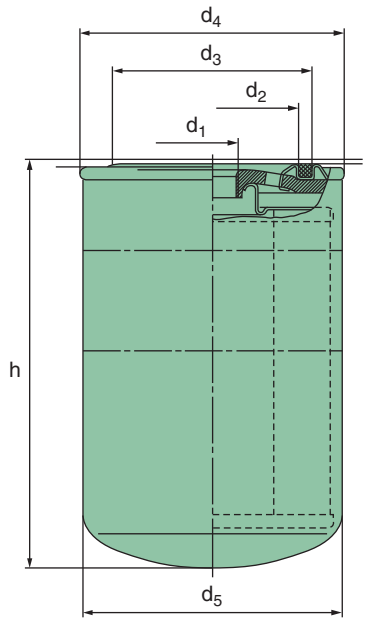
The table below lists selected examples from our range of filters. Many other variations with other media, valve equipment, seal materials, release devices, etc., are also available.

MANN-FILTER	Nominal flow rate [l/min] *[gpm]*	Dimensions in mm *(Dimensions in inches)* d_1	d_2	d_3	d_4	d_5	h	Filter fineness acc. to ISO 16 889 [µm (c)] * with 50% separation efficiency	99% efficiency	Non-return valve [bar]	By-pass valve [bar]	Permissible operating pressure [bar]	Type (see page 9)
W 712/20	15 *(3.96)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	80 *(3.15)*	76 *(2.99)*	79 *(3.11)*	20	> 50	–	2.5	14	C
W 712/4	20 *(5.28)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	80 *(3.15)*	76 *(2.99)*	93 *(3.66)*	20	> 50	0.12	2.5	14	C
W 712/52	15 *(3.96)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	80 *(3.15)*	76 *(2.99)*	79 *(3.11)*	14	38	0.12	2.5	14	C
W 719/14	25 *(6.61)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	80 *(3.15)*	76 *(2.99)*	123 *(4.84)*	20	> 50	0.12	2.5	14	C
W 719/30	25 *(6.61)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	80 *(3.15)*	76 *(2.99)*	123 *(4.84)*	14	38	0.12	2.5	14	C
W 920	30 *(7.93)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	95 *(3.74)*	20	> 50	0.12	2.5	14	A
W 920/7	30 *(7.93)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	95 *(3.74)*	14	38	0.12	1.5	14	B
W 930	30 *(7.93)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	114 *(4.49)*	20	> 50	0.12	2.5	14	A
W 930/21	30 *(7.93)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	114 *(4.49)*	14	38	0.12	3.0	14	B
W 940	50 *(13.21)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	142 *(5.59)*	20	> 50	0.12	2.5	14	A

* In comparison to the previously used calibration, the new calibration with the same filter results in a lower filter fineness with small particles.

W type

Full-flow oil filters



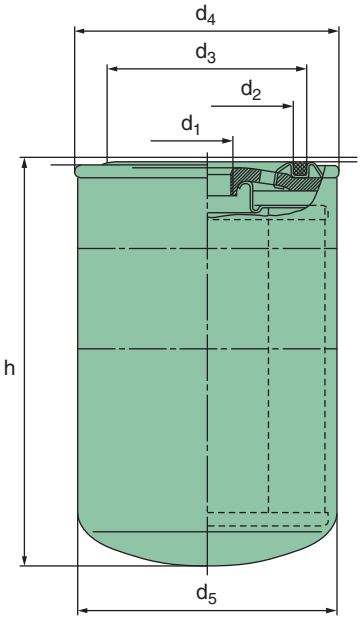
MANN-FILTER	Nominal flow rate [l/min] *[gpm]*	Dimensions in mm *(Dimensions in inches)*						Filter fineness acc. to ISO 16 889 [µm (c)] * with		Non-return valve	By-pass valve	Permissible operating pressure	Type
		d_1	d_2	d_3	d_4	d_5	h	50% separation	99% efficiency	[bar]	[bar]	[bar]	(see page 9)
W 940/51	50 *(13.21)*	G 3/4”	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	142 *(5.59)*	14	38	–	2.5	14	B
W 950	60 *(15.85)*	1”-12 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	170 *(6.69)*	20	> 50	0.12	2.5	14	B
W 950/17	60 *(15.85)*	1”-12 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	170 *(6.69)*	14	38	0.12	1.6	14	B
W 962/2	75 *(19.82)*	1”-12 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	210 *(8.27)*	14	36	0.12	2.5	14	A
W 962/6	75 *(19.82)*	1”-12 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	210 *(8.27)*	20	> 50	0.12	2.5	14	F
W 1160	50 *(13.21)*	M 30x2	93 *(3.66)*	104 *(4.09)*	110 *(4.33)*	108 *(4.25)*	178 *(7.01)*	14	38	–	2.5	14	A
W 11 102	100 *(26.42)*	1 1/8”-16 UN	93 *(3.66)*	103 *(4.06)*	110 *(4.33)*	108 *(4.25)*	260 *(10.24)*	20	> 50	0.12	2.5	14	A
W 11 102/4	75 *(19.82)*	1 1/8”-16 UN	93 *(3.66)*	103 *(4.06)*	110 *(4.33)*	108 *(4.25)*	260 *(10.24)*	14	36	0.12	2.5	14	A
W 1374/2	85 *(22.46)*	G 1 1/4”	100 *(3.94)*	111 *(4.37)*	140 *(5.51)*	136 *(5.35)*	177 *(6.97)*	20	> 50	–	–	Suction range - 0.8	E
W 1374/4	85 *(22.46)*	1 1/2”-16 UN	100 *(3.94)*	111 *(4.37)*	140 *(5.51)*	136 *(5.35)*	177 *(6.97)*	20	> 50	–	0.2	Suction range - 0.8	E
W 1374/6	85 *(22.46)*	1 1/2”-16 UN	100 *(3.94)*	111 *(4.37)*	140 *(5.51)*	136 *(5.35)*	177 *(6.97)*	15	> 36	–	0.2	Suction range - 0.8	E
W 13 145/1	180 *(47.56)*	1 1/2”-16 UN	100 *(3.94)*	111 *(4.37)*	140 *(5.51)*	136 *(5.35)*	302 *(11.89)*	20	> 50	0.12	2.5	14	E
W 13 145/6	180 *(47.56)*	M 42x2	100 *(3.94)*	111 *(4.37)*	140 *(5.51)*	136 *(5.35)*	302 *(11.89)*	14	36	–	2.5	14	E

* In comparison to the previously used calibration, the new calibration with the same filter results in a lower filter fineness with small particles.

W type, WD type

Full-flow oil filters for use with compressors

Oil filters used with compressors have to be free of silicon to enable use of the compressors on paint-spray lines. Furthermore, compressors have different requirements for oil filters in comparison to engines. Firstly, the life of the oil and the oil filter is considerably longer in a compressor than in an engine. Secondly, the compressor oil and oil filter are not exposed to combustion residues and in addition are subjected to a lower temperature level.



MANN-FILTER	Nominal flow rate [l/min] *[gpm]*	Dimensions in mm *(Dimensions in inches)*						Filter fineness acc. to ISO 16 889 [µm (c)] * with 50% separation	99% efficiency	Non-return valve [bar]	By-pass valve [bar]	Permissible operating pressure [bar]	Type (see page 9)
		d_1	d_2	d_3	d_4	d_5	h						
W 712/65	20 *(5.28)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	80 *(3.15)*	76 *(2.99)*	93 *(3.66)*	20	> 50	0.12	2.5	14	C
W 719/37	30 *(7.93)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	80 *(3.15)*	76 *(2.99)*	123 *(4.84)*	20	> 50	0.12	2.5	14	C
W 920/51	30 *(7.93)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	95 *(3.74)*	20	> 50	0.12	2.5	14	A
W 920/40	35 *(9.25)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	95 *(3.74)*	14	38	0.12	1.2	14	B
W 930/35	40 *(10.57)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	114 *(4.49)*	20	> 50	0.12	2.5	14	A
W 940/55	55 *(14.53)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	142 *(5.59)*	20	> 50	0.12	2.5	14	A
W 950/24	70 *(18.49)*	1" - 12 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	170 *(6.69)*	14	38	0.12	1.6	14	B
W 962/14	75 *(19.82)*	1" - 12 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	108 *(4.25)*	210 *(8.27)*	14	38	–	2.5	14	B
W 962/18	100 *(26.42)*	1" - 12 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	108 *(4.25)*	210 *(8.27)*	5	19	0.12	2.5	14	B
W 1170	70 *(18.49)*	1" - 12 UNF	93 *(3.66)*	104 *(4.09)*	110 *(4.33)*	108 *(4.25)*	227 *(8.94)*	14	38	0.12	1.2	14	C
W 11 102	100 *(26.42)*	1 1/8" - 16 UN	93 *(3.66)*	104 *(4.09)*	110 *(4.33)*	108 *(4.25)*	260 *(10.24)*	20	> 50	0.12	2.5	14	C
WD 962/21	65 *(17.17)*	1" - 12 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	212 *(8.34)*	4	10	–	2.5	25	E
WD 13 145/8	190 *(50.20)*	1 1/2" - 16 UN	100 *(3.94)*	111 *(4.37)*	140 *(5.51)*	136 *(5.35)*	302 *(11.89)*	15	38	–	2.5	20	E
WD 13 145/10	190 *(50.20)*	1 1/2" - 16 UN	100 *(3.94)*	111 *(4.37)*	140 *(5.51)*	136 *(5.35)*	302 *(11.89)*	< 3	7	–	2.5	20	E
WD 13 145/14	210 *(55.48)*	1 1/2" - 16 UN	100 *(3.94)*	111 *(4.37)*	140 *(5.51)*	136 *(5.35)*	302 *(11.89)*	4	10	–	2.5	20	E

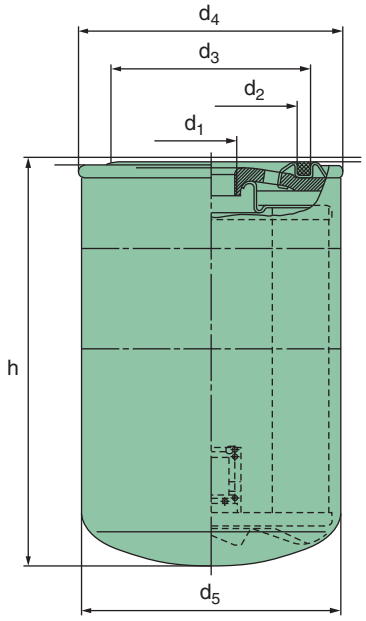
* In comparison to the previously used calibration, the new calibration with the same filter results in a lower filter fineness with small particles.

WD type, WH type

Full-flow oil filters

The WD filters are spin-on filters designed to handle operating pressures between 20 and 35 bar. They are suitable for lube-oil circuits where higher pressure stability is required.

WH spin-on filters have a similar design to the WD type but are designed to handle pressures up to 35 bar. They are mainly used in hydraulic applications.



MANN-FILTER	Nominal flow rate [l/min] *[gpm]*	Dimensions in mm *(Dimensions in inches)*						Filter fineness acc. to ISO 16 889 [µm (c)] * with 50% separation	99% efficiency	Non-return valve [bar]	By-pass valve [bar]	Permissible operating pressure [bar]	Type (see page 9)
		d_1	d_2	d_3	d_4	d_5	h						
WH 945/1	70 *(18.49)*	1 3/8" - 12 UNF	– –	– –	97 *(3.28)*	94.2 *(3.71)*	152 *(5.98)*	7	22	–	–	35	E
WH 945/2	70 *(18.49)*	1 3/8" - 12 UNF	– –	– –	97 *(3.28)*	94.2 *(3.71)*	152 *(5.98)*	4	11	–	–	35	E
WH 980	100 *(26.42)*	1 3/8" - 12 UNF	– –	– –	97 *(3.28)*	94.2 *(3.71)*	240 *(9.45)*	7	22	–	–	35	E
WH 980/1	100 *(26.42)*	1 3/8" - 12 UNF	– –	– –	97 *(3.28)*	94.2 *(3.71)*	240 *(9.45)*	4	11	–	–	35	E
WD 724/6	25 *(6.61)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	80 *(3.15)*	76 *(2.99)*	138 *(5.43)*	11	28	–	3.5	35	E
WD 920	25 *(6.61)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	97 *(3.82)*	20	> 50	–	2.5	25	E
WD 940	50 *(13.21)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	144 *(5.67)*	20	50	–	2.5	25	E
WD 940/2	50 *(13.21)*	3/4" - 16 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	144 *(5.67)*	14	38	–	3.5	25	E
WD 950	60 *(15.85)*	1"- 12 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	172 *(6.77)*	20	> 50	–	2.5	25	E
WD 950/2	60 *(15.85)*	1"- 12 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	172 *(6.77)*	15	36	–	2.5	25	E
WD 962	75 *(19.82)*	1"- 12 UNF	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	212 *(8.35)*	20	> 50	–	2.5	25	E
WD 962/9	75 *(19.82)*	M 24x1.5	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	212 *(8.35)*	6	22	–	2.5	25	E
WD 1374	95 *(25.10)*	1 1/2" - 16 UN	100 *(3.94)*	111 *(4.37)*	140 *(5.51)*	136 *(5.35)*	177 *(6.97)*	20	> 50	–	–	–	E
WD 13 145	180 *(47.56)*	1 1/2" - 16 UN	100 *(3.94)*	111 *(4.37)*	140 *(5.51)*	136 *(5.35)*	302 *(11.89)*	20	> 50	–	2.5	20	E
WD 13 145/4	180 *(47.56)*	1 1/2" - 16 UN	100 *(3.94)*	111 *(4.37)*	140 *(5.51)*	136 *(5.35)*	302 *(11.89)*	14	38	–	2.5	20	E

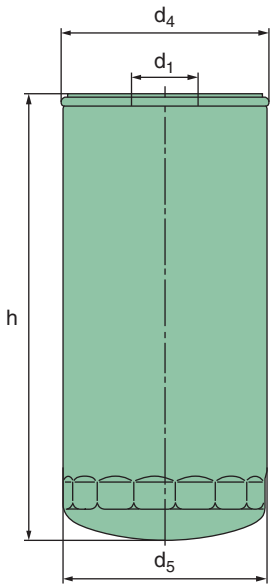
* In comparison to the previously used calibration, the new calibration with the same filter results in a lower filter fineness with small particles.

WP type

Partial-flow oil filters

The partial-flow filter always works together with a full-flow filter. The types WP 1170 and WP 11 102 are solely partial-flow filters. All other WP types are a combination of full-flow and partial-flow filter.

Further types are available on request.



MANN-FILTER	Nominal flow rate [l/min] *[gpm]*	Dimensions in mm *(Dimensions in inches)*				Filter fineness (full flow) acc. ISO 16 889 [µm (c)] * with 50% 99% separation efficiency		Filter fineness (partial flow) acc. ISO 16 889 [µm (c)] * with 50% 99% separation efficiency		Non-return valve [bar]	By-pass valve [bar]	Permissible operating pressure [bar]	Type (see page 9)
		d_1	d_4	d_5	h								
WP 914/80	14 *(3.70)*	M 24x1.5	103 *(4.06)*	102 *(4.02)*	81 *(3.19)*	20	> 50	14	38	0.12	1	10	C
WP 928/82	11 *(2.91)*	1" - 12 UNF	93 *(3.78)*	93 *(3.78)*	120 *(4.72)*	20	> 50	5	19	0.12	–	14	E
WP 1144	26 *(6.87)*	3/4" - 16 UNF	110 *(4.33)*	108 *(4.25)*	145 *(5.71)*	14	36	< 3	6	0.12	2.5	14	C
WP 1169	45 *(11.89)*	M 30x2	110 *(4.33)*	108 *(4.25)*	213 *(8.39)*	14	36	< 3	6	0.12	2.5	14	C
WP 1170	4.5 *(1.19)*	M 22x1.5	110 *(4.33)*	108 *(4.25)*	227 *(8.94)*	–	–	< 3	15	–	–	14	C
WP 11 102	6.5 *(1.72)*	1 3/8" - 16 UN	110 *(4.33)*	108 *(4.25)*	260 *(10.24)*	–	–	< 3	15	–	–	14	C

* In comparison to the previously used calibration, the new calibration with the same filter results in a lower filter fineness with small particles.

MANN+HUMMEL In-line oil filters

MANN+HUMMEL In-line oil filters

MANN+HUMMEL in-line filters are used mainly in hydraulic systems, for the filtration of engine and gearbox oil, and in lube-oil circuits in general mechanical engineering applications. The range of filters includes filters with single heads, duplex filters without changeover, duplex filters with changeover, and large triplex oil filters. The filtration characteristics depend on the respective spin-on filter and used filter medium.

The advantages at a glance:

- Easy to fit to existing lines
- Solid and stable cast aluminium construction
- Increased flexibility available for standard version with option of optical or electrical service switch (see pages 89+90)
- Duplex types with changeover available
- Minimal pressure drop
- Proven quality of MANN+HUMMEL spin-on filters

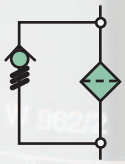
Design

The filters consist of the filter head with connection threads, mounting holes and the MANN+HUMMEL spin-on filter.

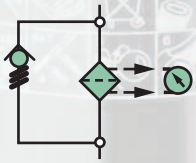
MANN+HUMMEL service indicators, service switches and bypass valves have to be selected such that when a service is necessary a signal is given before the bypass valve opens. Should you have any questions please get in touch with your MANN+HUMMEL contact partner.

Available versions:

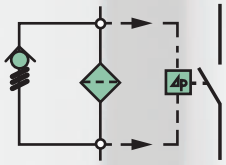
- with bypass valve without service indicator



- with bypass valve and service indicator



- with bypass valve and service switch (make/break contact convertible)



Installation and maintenance

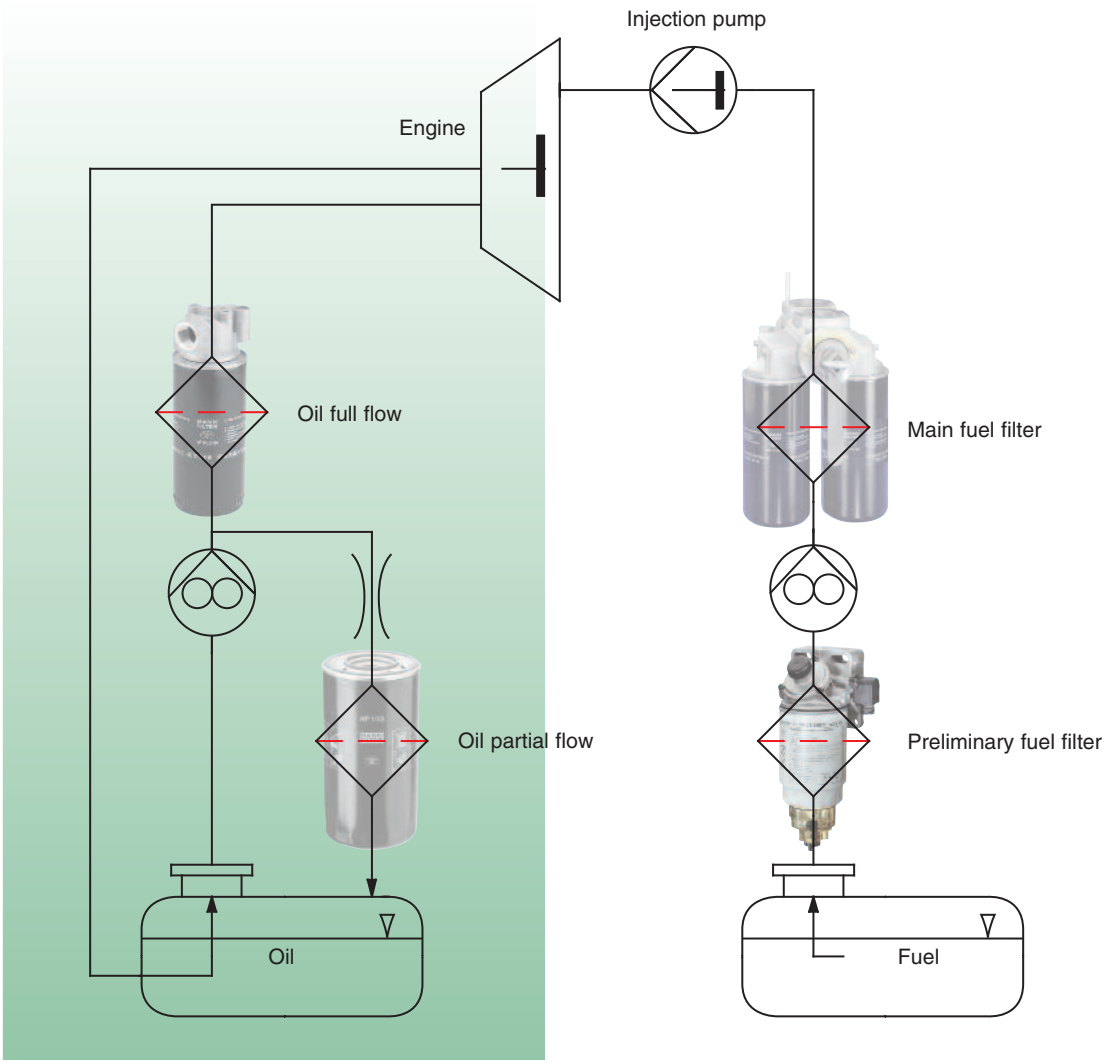
The filter is fitted in the pipeline, whereby the flow direction has to be observed. This is indicated by arrows on the connection threads.

The time for maintenance is usually defined by the engine or equipment manufacturer. Maintenance simply requires replacement of the complete spin-on filter.

The respective spin-on filter can easily be removed using a MANN+HUMMEL filter wrench (see page 88).

The in-line filter allows various combinations of the spin-on filter and filter head. This catalogue only lists the basic types. If you do not find an in-line filter suitable for your application, please get in touch with your MANN+HUMMEL contact partners. They will be happy to advise you on the appropriate in-line filter consisting of a filter head, spin-on filter and accessories.

Diagram of filter arrangement around the engine



Overview of oil filter heads

Single head with flange connection

Page 20

Compact filter head with low space requirement and the connections made from above. In spite of its compact form the head has advanced flow characteristics without deflection of the flow.

Single in-line head

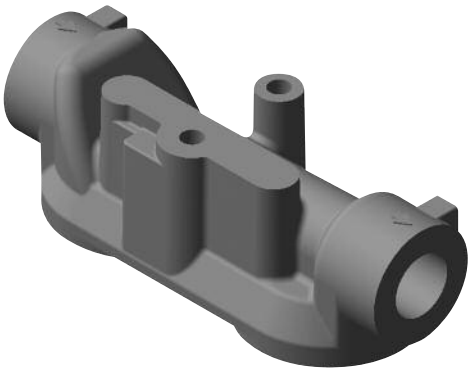
Page 21+22
Page 24+25
Page 30

This universal filter head is designed for installation in pipelines. The heads already have mounting holes suitable for installation of a MANN+HUMMEL service switch and service indicator (see pages 89+90) available as an optional extra.

Overview of oil filter heads

In-line duplex without changeover **Page 23+26**

This head allows the fitting of two filters in parallel to enable a higher volume flow or longer filter service life.



In-line duplex with changeover **Page 28+29**

This robust filter head suitable for heavy duty applications enables a filter change to be carried out during continuous operation.

In-line triplex **Page 27**

This filter head has three filters fitted in parallel to enable a higher volume flow or a longer filter service life.

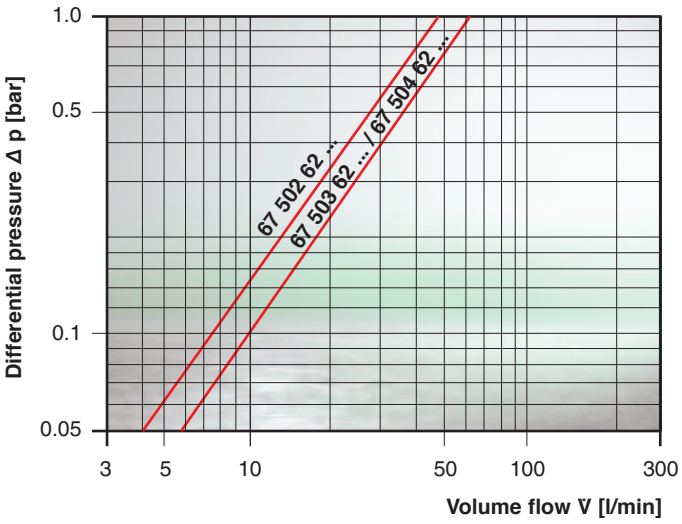
In-line oil filters with single head

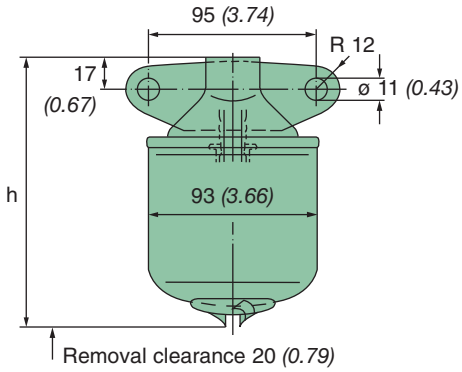
Operating pressure 14 bar, up to 40 l/min – Flange connection

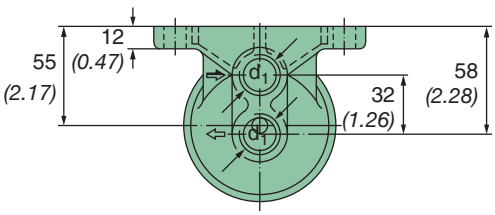
This light and robust filter head is mounted with two screws to a flat surface. The filter inlet and outlet are from above.

Characteristics

Flow resistance acc. to ISO 3968 with 36 mm²/s.







Part no.	Nominal flow rate [l/min] *[gpm]*	MANN-FILTER (see page 10)	Dimensions in mm *(Dimensions in inches)* d_1	h	Weight approx. [kg]
67 502 62 026	25 *(6.61)*	**W 920**	M 20x1.5	145 *(5.71)*	0.7
67 503 62 026	40 *(10.6)*	**W 940**	M 20x1.5	192 *(7.56)*	0.8
67 502 62 106	25 *(6.61)*	**W 920**	G 1/2”	145 *(5.71)*	0.7
67 504 62 126	40 *(10.6)*	**W 940**	G 1/2”	192 *(7.56)*	0.8

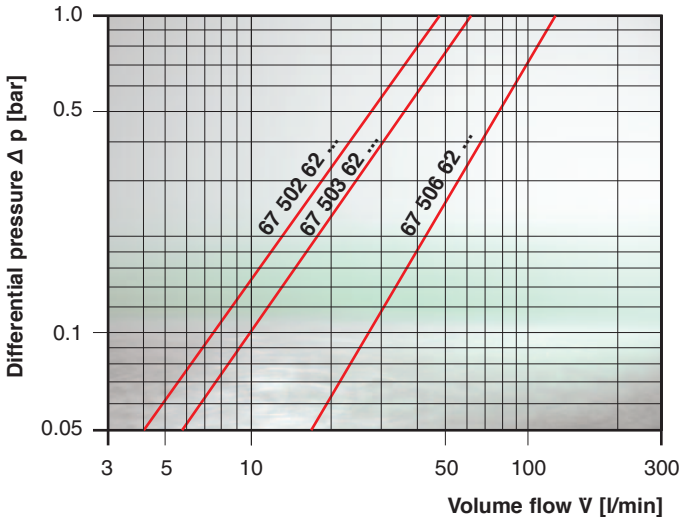
In-line oil filters with single head

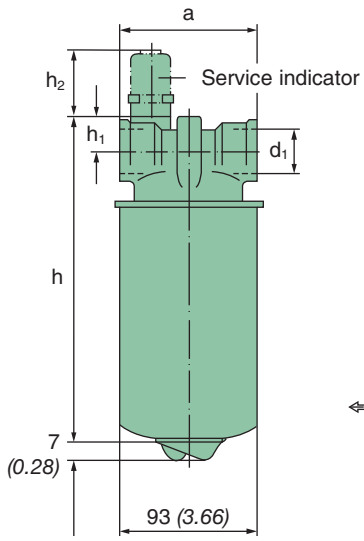
Operating pressure: 14 bar, up to 70 l/min (in-line)

This design has the inlet and the outlet on the side (in-line).

Characteristics

Flow resistance acc. to ISO 3968 with 36 mm²/s.





Removal clearance 30 *(1.18)*

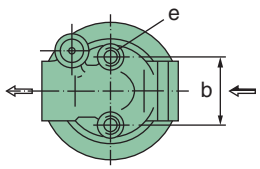


Fig. 1

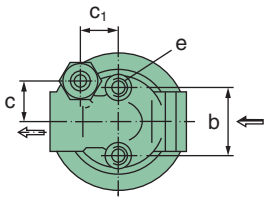


Fig. 2

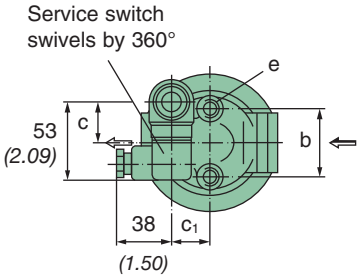


Fig. 3

Part no.	Fig.	MANN-FILTER (see pages 10+11)	Dimensions in mm *(Dimensions in inches)* a	b	c	c_1	d_1 [1]	e	h	h_1	h_2	Service indication	Weight approx. [kg]
Nominal flow rate up to 25 l/min *(6.6 gpm)*													
67 502 62 256	1	**W 920**	90 *(3.54)*	40 *(1.57)*	–	–	G 1/2”	M 8	147 *(5.79)*	22 *(0.87)*	–	–	1.2
67 502 62 236	2	**W 920**	90 *(3.54)*	40 *(1.57)*	21.5 *(0.83)*	24 *(0.94)*	G 1/2”	M 8	147 *(5.79)*	22 *(0.87)*	46 *(1.81)*	optical	1.2
67 502 62 226	3	**W 920**	90 *(3.54)*	40 *(1.57)*	21.5 *(0.83)*	24 *(0.94)*	G 1/2”	M 8	147 *(5.79)*	22 *(0.87)*	62 *(2.44)*	electrical	1.3
Nominal flow rate up to 40 l/min *(13.2 gpm)*													
67 503 62 306	1	**W 940**	90 *(3.54)*	40 *(1.57)*	–	–	G 1/2”	M 8	194 *(7.64)*	22 *(0.87)*	–	–	1.2
67 503 62 276	2	**W 940**	90 *(3.54)*	40 *(1.57)*	21.5 *(0.83)*	24 *(0.94)*	G 1/2”	M 8	194 *(7.64)*	22 *(0.87)*	46 *(1.81)*	optical	1.2
67 503 62 266	3	**W 940**	90 *(3.54)*	40 *(1.57)*	21.5 *(0.83)*	24 *(0.94)*	G 1/2”	M 8	194 *(7.64)*	22 *(0.87)*	62 *(2.44)*	electrical	1.3
Nominal flow rate up to 70 l/min *(18.5 gpm)*													
67 506 62 706	1	**W 962/2**	95 *(3.74)*	47.5 *(1.87)*	–	–	G 1”	M 10	269 *(10.59)*	25 *(0.98)*	–	–	1.6
67 506 62 666	2	**W 962/2**	95 *(3.74)*	47.5 *(1.87)*	28.5 *(1.12)*	26 *(1.02)*	G 1”	M 10	269 *(10.59)*	25 *(0.98)*	46 *(1.81)*	optical	1.6
67 506 62 676	3	**W 962/2**	95 *(3.74)*	47.5 *(1.87)*	28.5 *(1.12)*	26 *(1.02)*	G 1”	M 10	269 *(10.59)*	25 *(0.98)*	62 *(2.44)*	electrical	1.7

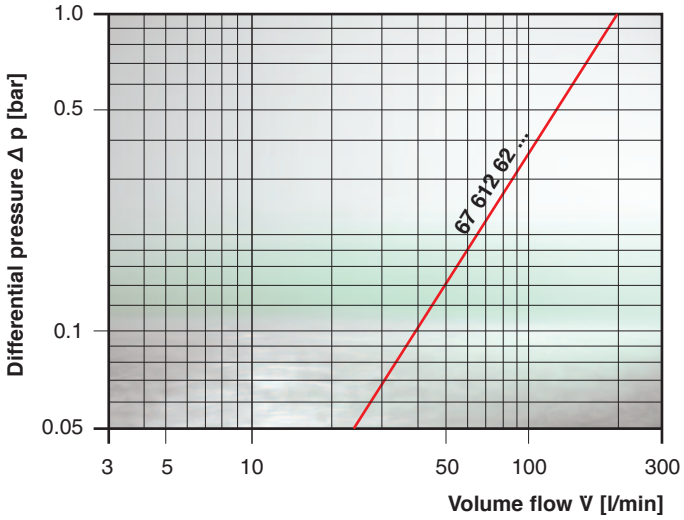
1) Further threads available on request.

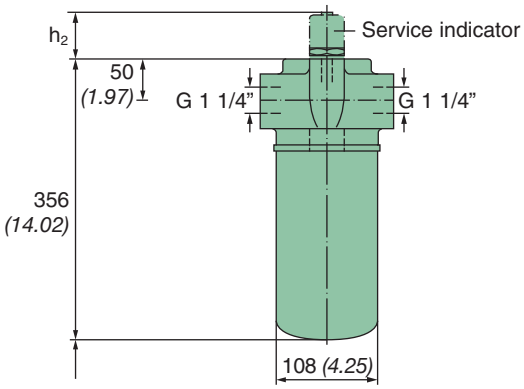
In-line oil filters with single head

Operating pressure: 14 bar, up to 100 l/min (in-line)

Characteristics

Flow resistance acc. to ISO 3968 with 36 mm²/s.





Removal clearance 30 *(1.18)*

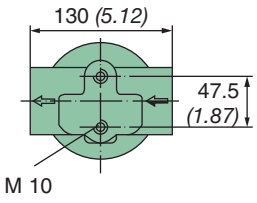


Fig. 1

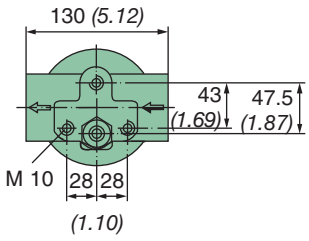


Fig. 2

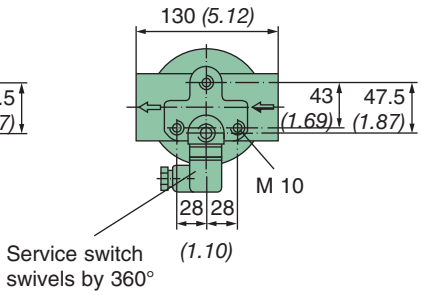


Fig. 3

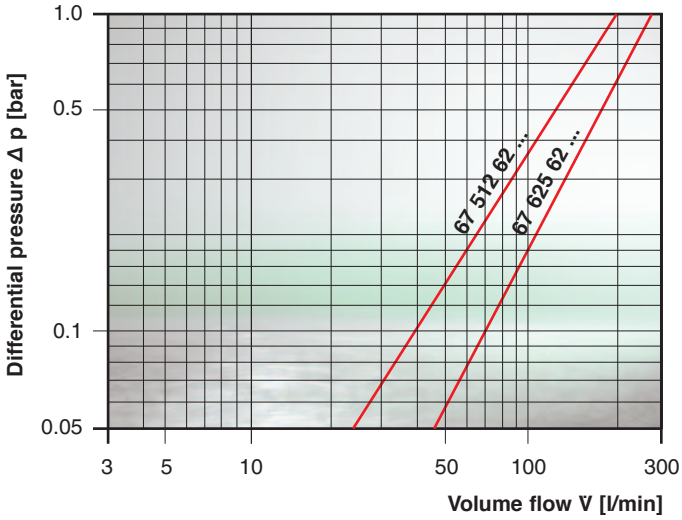
Part no.	Fig.	Nominal flow rate [l/min] *[gpm]*	MANN-FILTER (see page 11)	Dimensions in mm *(Dimensions in inches)* h_2	Service indication	Weight approx. [kg]
67 612 62 146	1	100 *(26.42)*	**W 11 102**	–	–	2.4
67 612 62 176	2	100 *(26.42)*	**W 11 102**	46 *(1.81)*	optical	2.5
67 612 62 166	3	100 *(26.42)*	**W 11 102**	62 *(2.44)*	electrical	2.5

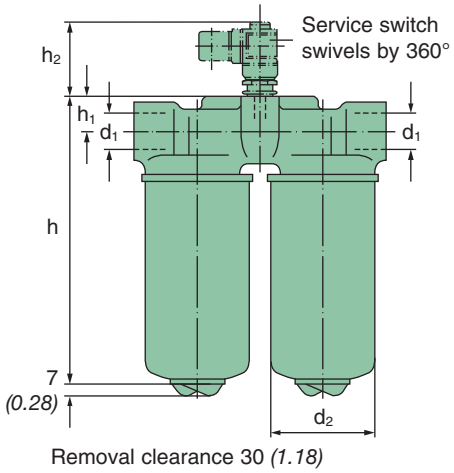
In-line duplex oil filters without changeover

Operating pressure: 14 bar, up to 180 l/min (in-line)

Characteristics

Flow resistance acc. to ISO 3968 with 36 mm²/s.





Removal clearance 30 *(1.18)*

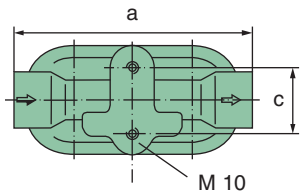


Fig. 1

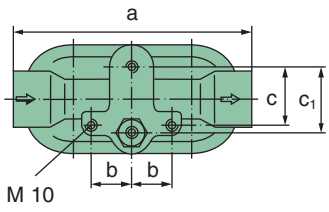


Fig. 2

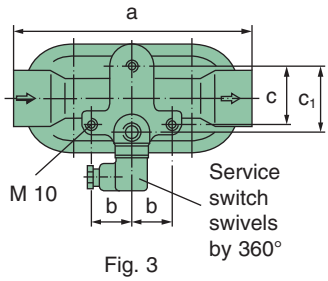


Fig. 3

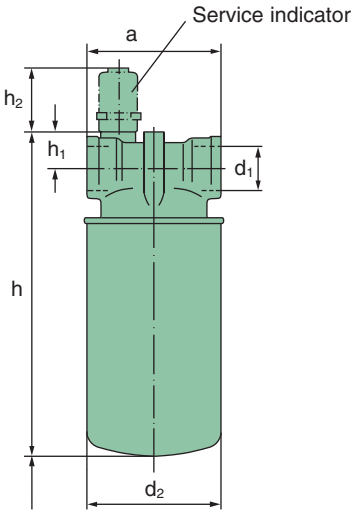
Part no.	Fig.	MANN-FILTER (see page 11)	Dimensions in mm *(Dimensions in inches)*									Service indi-cation	Weight approx. [kg]
			a	b	c	c_1	d_1 [2]	d_2	h	h_1	h_2		
Nominal flow rate up to 120 l/min *(31.7 gpm)*													
67 512 62 106	1	**2x W 962/2**	200 *(7.87)*	–	47.5 *(1.87)*	–	G 1”	93 *(3.66)*	275 *(10.83)*	30 *(1.18)*	–	–	2.5
67 512 62 136	2	**2x W 962/2**	200 *(7.87)*	40 *(1.57)*	43 *(1.69)*	47.5 *(1.87)*	G 1”	93 *(3.66)*	275 *(10.83)*	30 *(1.18)*	46 *(1.81)*	optical	2.6
67 512 62 126	3	**2x W 962/2**	200 *(7.87)*	40 *(1.57)*	43 *(1.69)*	47.5 *(1.87)*	G 1”	93 *(3.66)*	275 *(10.83)*	30 *(1.18)*	62 *(2.44)*	electrical	2.6
Nominal flow rate up to 180 l/min *(47.6 gpm)*													
67 625 62 106 [1]	1	**2x W 11 102**	270 *(10.63)*	–	70 *(2.76)*	–	G 1 1/2”	108 *(4.25)*	337 *(13.27)*	35 *(1.38)*	–	–	4.6
67 625 62 116 [1]	2	**2x W 11 102**	270 *(10.63)*	45 *(1.77)*	65 *(2.56)*	70 *(2.76)*	G 1 1/2”	108 *(4.25)*	337 *(13.27)*	35 *(1.38)*	46 *(1.81)*	optical	4.7
67 625 62 126 [1]	3	**2x W 11 102**	270 *(10.63)*	45 *(1.77)*	65 *(2.56)*	70 *(2.76)*	G 1 1/2”	108 *(4.25)*	337 *(13.27)*	35 *(1.38)*	62 *(2.44)*	electrical	4.7

1) The filters are supplied without a special wrench profile.

2) Further threads are available on request.

In-line oil filters with single head

Operating pressure: 20/25/35 bar, up to 180 l/min (in-line)



Removal clearance 30 *(1.18)*

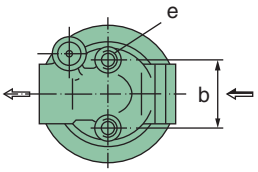


Fig. 1

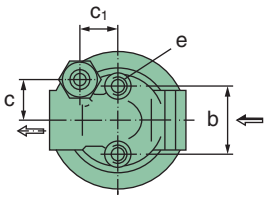


Fig. 2

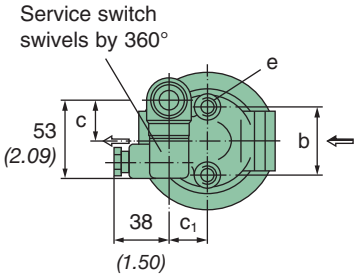
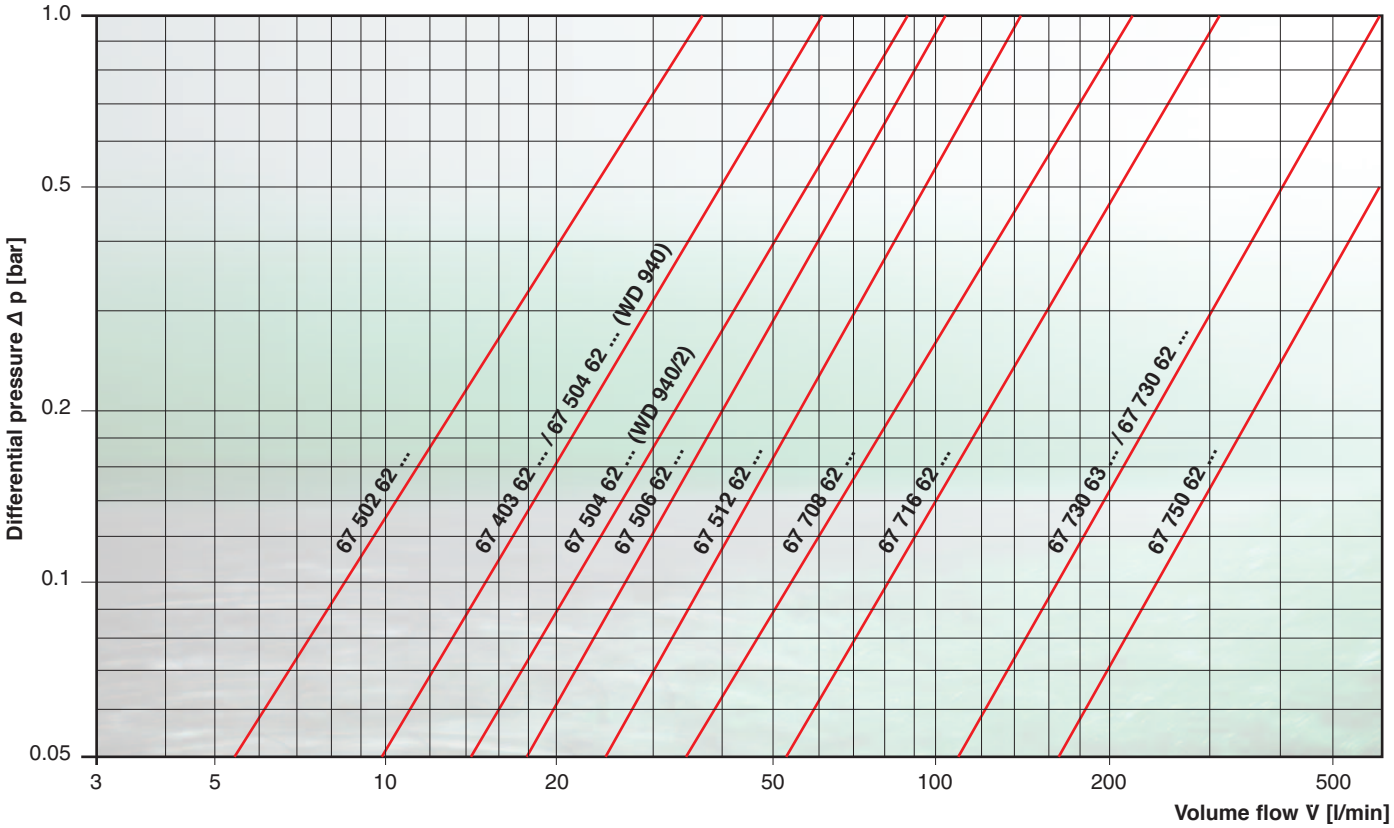


Fig. 3

Characteristics

Flow resistance acc. to ISO 3968 with 36 mm²/s.



In-line oil filters with single head

Operating pressure: 20/25/35 bar, up to 180 l/min (in-line)

Part no.	Fig.	Nominal flow rate [l/min][3] *[gpm]*	MANN-FILTER (see page 13)	Dimensions in mm *(Dimensions in inches)* a	b	c	c_1	d_1 [1]	d_2	e	h	h_1	h_2	Service indi-cation	Weight approx. [kg]
Operating pressure 35 bar *(3.5 MPa)*															
67 403 62 246	1	20 *(5.28)*	**WD 724/6**	90 *(3.54)*	40 *(1.57)*	–	–	G 1/2”	76 *(2.99)*	M 8	192 *(7.56)*	22 *(0.87)*	–	–	0.9
Operating pressure 25 bar *(2.5 MPa)*															
67 502 62 246	1	25 *(6.60)*	**WD 920**	90 *(3.54)*	40 *(1.57)*	–	–	G 1/2”	93 *(3.66)*		149 *(5.87)*	22 *(0.87)*	–	–	0.8
67 502 62 216	2	25 *(6.60)*	**WD 920**	90 *(3.54)*	40 *(1.57)*	21.5 *(0.85)*	24 *(0.94)*	G 1/2”	93 *(3.66)*		149 *(5.87)*	22 *(0.87)*	46 *(1.81)*	optical	0.8
67 502 62 206	3	25 *(6.60)*	**WD 920**	90 *(3.54)*	40 *(1.57)*	21.5 *(0.85)*	24 *(0.94)*	G 1/2”	93 *(3.66)*		149 *(5.87)*	22 *(0.87)*	62 *(2.44)*	electrical	0.8
67 504 62 436	1	40 *(10.57)*	**WD 940**	90 *(3.54)*	40 *(1.57)*	–	–	G 1/2”	93 *(3.66)*		196 *(7.72)*	22 *(0.87)*	–	–	1.3
67 504 62 456	2	40 *(10.57)*	**WD 940**	90 *(3.54)*	40 *(1.57)*	21.5 *(0.85)*	24 *(0.94)*	G 1/2”	93 *(3.66)*		196 *(7.72)*	22 *(0.87)*	46 *(1.81)*	optical	1.4
67 504 62 446	3	40 *(10.57)*	**WD 940**	90 *(3.54)*	40 *(1.57)*	21.5 *(0.85)*	24 *(0.94)*	G 1/2”	93 *(3.66)*		196 *(7.72)*	22 *(0.87)*	62 *(2.44)*	electrical	1.4
67 504 62 426	1	40 *(10.57)*	**WD 940/2**	95 *(3.74)*	47.5 *(1.87)*	–	–	G 1”	93 *(3.66)*	M 10	203 *(7.99)*	25 *(0.98)*	–	–	0.9
67 504 62 416	2	40 *(10.57)*	**WD 940/2**	95 *(3.74)*	47.5 *(1.87)*	28.5 *(1.12)*	26 *(1.02)*	G 1”	93 *(3.66)*		203 *(7.99)*	25 *(0.98)*	46 *(1.81)*	optical	1.0
67 504 62 406	3	40 *(10.57)*	**WD 940/2**	95 *(3.74)*	47.5 *(1.87)*	28.5 *(1.12)*	26 *(1.02)*	G 1”	93 *(3.66)*		203 *(7.99)*	25 *(0.98)*	62 *(2.44)*	electrical	1.0
67 506 62 756	1	70 *(18.49)*	**WD 962**	95 *(3.74)*	47.5 *(1.87)*	–	–	G 3/4”	93 *(3.66)*		271 *(10.67)*	25 *(0.98)*	–	–	2.7
67 506 62 696	1	70 *(18.49)*	**WD 962**	95 *(3.74)*	47.5 *(1.87)*	–	–	G 1”	93 *(3.66)*		271 *(10.67)*	25 *(0.98)*	–	–	2.7
67 506 62 656	2	70 *(18.49)*	**WD 962**	95 *(3.74)*	47.5 *(1.87)*	28.5 *(1.12)*	26 *(1.02)*	G 1”	93 *(3.66)*		271 *(10.67)*	25 *(0.98)*	46 *(1.81)*	optical	2.8
67 506 62 646	3	70 *(18.49)*	**WD 962**	95 *(3.74)*	47.5 *(1.87)*	28.5 *(1.12)*	26 *(1.02)*	G 1”	93 *(3.66)*		271 *(10.67)*	25 *(0.98)*	62 *(2.44)*	electrical	2.8
Operating pressure 20 bar *(2.0 MPa)*															
67 708 62 146[2]	1	95 *(25.09)*	**WD 1374**	135 *(5.32)*	56 *(2.20)*	–	–	G 1 1/4”	136 *(5.35)*		246 *(9.69)*	28 *(1.10)*	–	–	3.0
67 708 62 156[2]	2	95 *(25.09)*	**WD 1374**	135 *(5.32)*	56 *(2.20)*	30 *(1.18)*	26 *(1.02)*	G 1 1/4”	136 *(5.35)*		246 *(9.69)*	28 *(1.10)*	46 *(1.81)*	optical	3.1
67 708 62 166[2]	3	95 *(25.09)*	**WD 1374**	135 *(5.32)*	56 *(2.20)*	30 *(1.18)*	26 *(1.02)*	G 1 1/4”	136 *(5.35)*		246 *(9.69)*	28 *(1.10)*	62 *(2.44)*	electrical	3.1
67 716 62 216	1	180 *(47.55)*	**WD 13 145**	135 *(5.32)*	56 *(2.20)*	–	–	G 1 1/4”	136 *(5.35)*		371 *(14.61)*	28 *(1.10)*	–	–	3.4
67 716 62 226	2	180 *(47.55)*	**WD 13 145**	135 *(5.32)*	56 *(2.20)*	30 *(1.18)*	26 *(1.02)*	G 1 1/4”	136 *(5.35)*		371 *(14.61)*	28 *(1.10)*	46 *(1.81)*	optical	3.5
67 716 62 236	3	180 *(47.55)*	**WD 13 145**	135 *(5.32)*	56 *(2.20)*	30 *(1.18)*	26 *(1.02)*	G 1 1/4”	136 *(5.35)*		371 *(14.61)*	28 *(1.10)*	62 *(2.44)*	electrical	3.5

1) Further threads available on request.
2) Without bypass valve.
3) Flow rates are valid for liquids with 36 mm²/s and flow resistance according to the diagram on page 24.

In-line duplex oil filters without changeover

Operating pressure: 20/25 bar, up to 360 l/min (in-line)

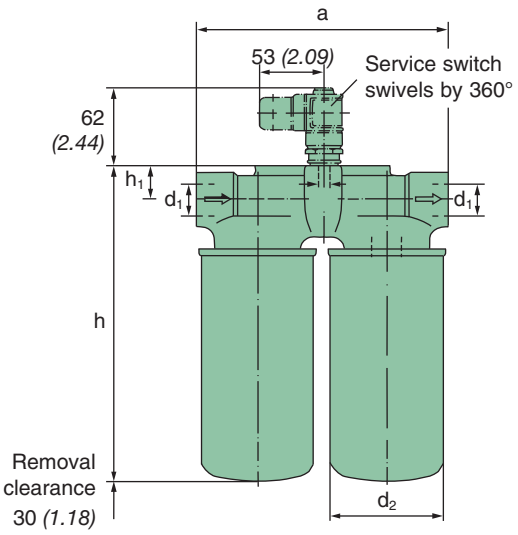


Fig. 1

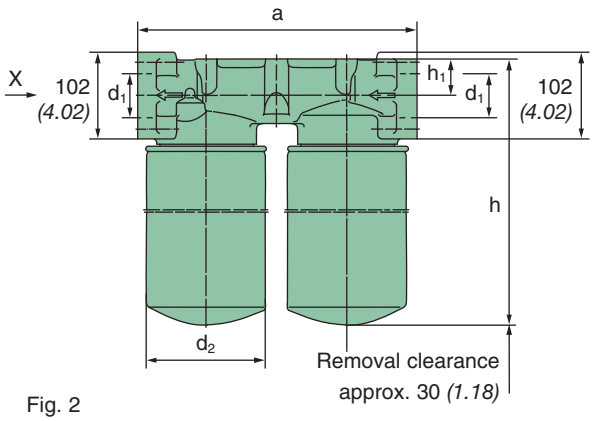
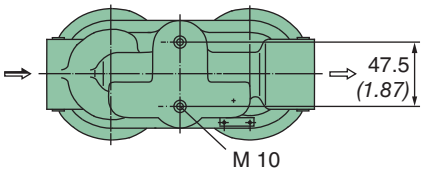


Fig. 2

Fig. 1.1



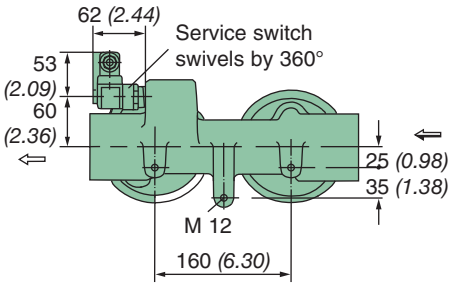
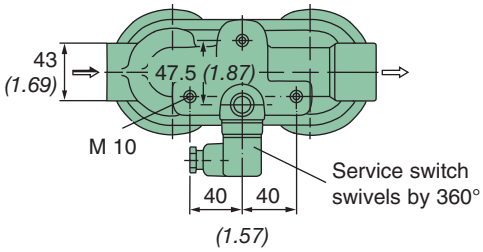
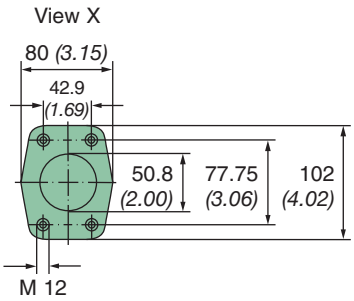


Fig. 1.2





Part no.	Fig.	MANN-FILTER (see page 13)	Dimensions in mm *(Dimensions in inches)* a	d_1 [1]	d_2	h	h_1	Permissible operating pressure [bar]	[MPa]	Service indication	Weight approx. [kg]
Nominal flow rate up to 120 l/min *(31.7 gpm)* [2]											
67 512 62 156	1.1	**2 x WD 962**	200 *(7.87)*	G 1”	93 *(3.66)*	277 *(10.91)*	30 *(1.18)*	25	2.5	–	3.0
67 512 62 166	1.2	**2 x WD 962**	200 *(7.87)*	G 1”	93 *(3.66)*	277 *(10.91)*	30 *(1.18)*	25	2.5	optical	3.2
67 512 62 176	1.2	**2 x WD 962**	200 *(7.87)*	G 1”	93 *(3.66)*	277 *(10.91)*	30 *(1.18)*	25	2.5	electrical	3.2
Nominal flow rate up to 360 l/min *(95.1 gpm)* [2]											
67 730 62 296	2	**2 x WD 13 145**	320 *(12.60)*	G 2”	136 *(5.35)*	402 *(15.83)*	42 *(1.65)*	20	2	–	6.8
67 730 62 266	2	**2 x WD 13 145**	320 *(12.60)*	G 2”	136 *(5.35)*	402 *(15.83)*	42 *(1.65)*	20	2	optical	6.9
67 730 62 256	2	**2 x WD 13 145**	320 *(12.60)*	G 2”	136 *(5.35)*	402 *(15.83)*	42 *(1.65)*	20	2	electrical	6.9

1) Further threads available on request.
2) Flow rates are valid for liquids with 36 mm²/s and flow resistance according to the diagram on page 24.

In-line triplex oil filters

Operating pressure: 20 bar, up to 540 l/min (in-line)

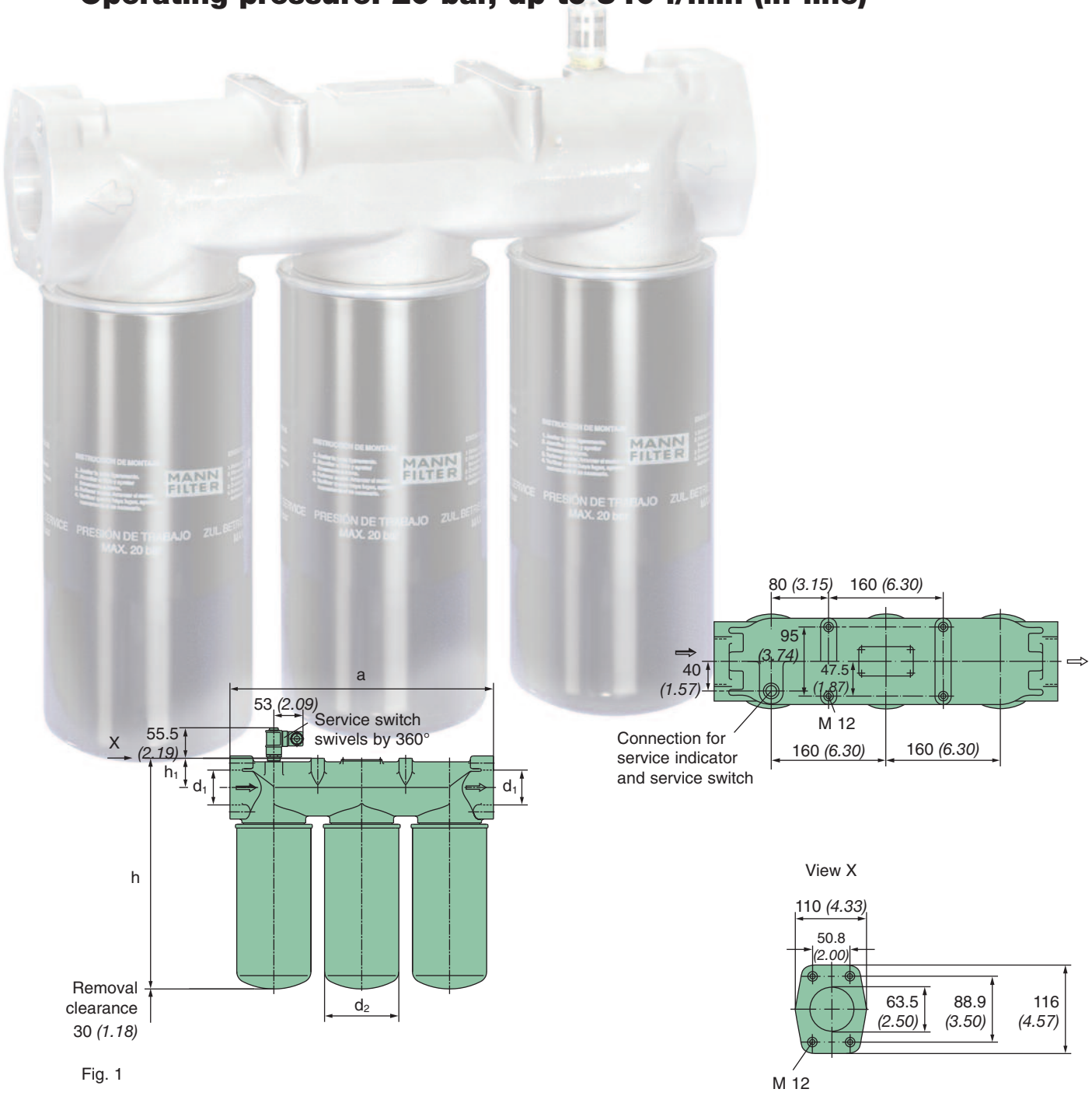


Fig. 1

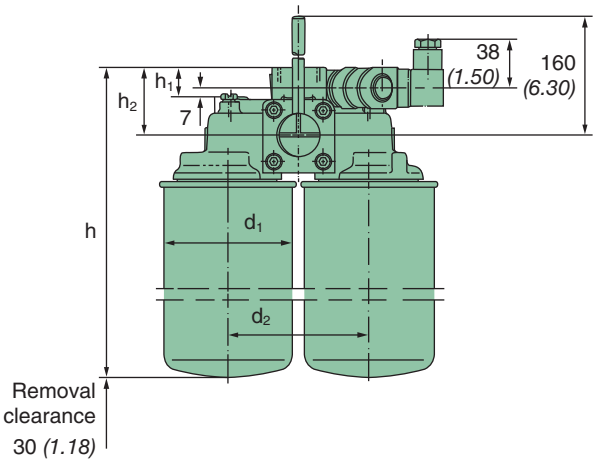
Part no.	Fig.	MANN-FILTER (see page 13)	Dimensions in mm *(Dimensions in inches)* a	d_1	d_2	h	h_1	Permissible operating pressure [bar]	[MPa]	Service indication	Weight approx. [kg]
Nominal flow rate up to 540 l/min *(142.7 gpm)* [1]											
67 750 62 106	1	**3 x WD 13 145**	480 *(18.90)*	SAE	136 *(5.35)*	424.5 *(16.71)*	53.5 *(2.11)*	20	2	–	10.1
67 750 62 116	1	**3 x WD 13 145**	480 *(18.90)*	SAE	136 *(5.35)*	424.5 *(16.71)*	53.5 *(2.11)*	20	2	optical	10.2
67 750 62 126	1	**3 x WD 13 145**	480 *(18.90)*	SAE	136 *(5.35)*	424.5 *(16.71)*	53.5 *(2.11)*	20	2	electrical	10.2

1) Flow rates are valid for liquids with 36 mm²/s and flow resistance according to the diagram on page 24.

In-line duplex oil filters with changeover

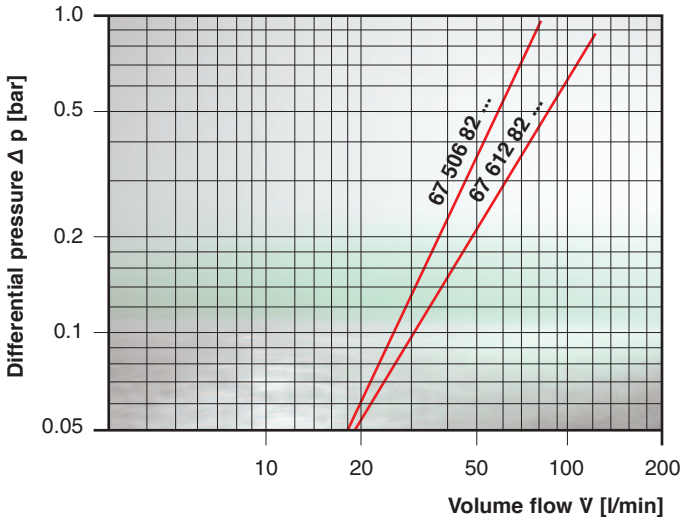
Operating pressure: 10/25 bar, up to 100 l/min

The changeover function enables filter maintenance without a break in operation.



Characteristics

Flow resistance acc. to ISO 3968 with 36 mm²/s.



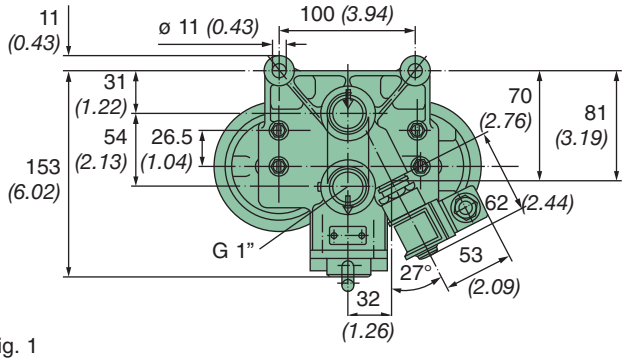


Fig. 1

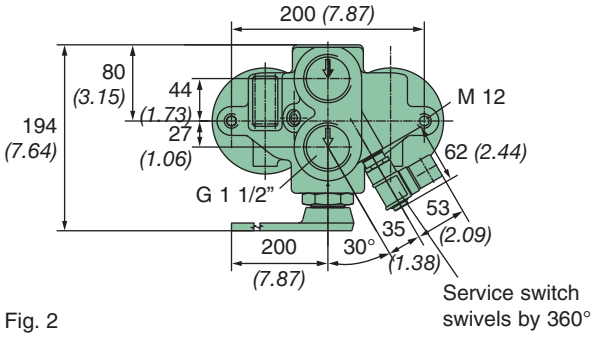


Fig. 2

Part no.	Fig.	MANN-FILTER (see pages 12+13)	Dimensions in mm *(Dimensions in inches)* d_1	d_2	h	h_1	h_2	Permissible operating pressure [bar]	[MPa]	Service indication	Weight approx. [kg]
Nominal flow rate up to 80 l/min *(21.14 gpm)* [2]											
67 506 82 176 [3]	1	**2 x WD 962**	93 *(3.66)*	102 *(4.02)*	294 *(11.57)*	22 *(0.87)*	50 *(1.97)*	25	2.5	–	4.1
67 506 82 166	1	**2 x WD 962**	93 *(3.66)*	102 *(4.02)*	294 *(11.57)*	22 *(0.87)*	50 *(1.97)*	25	2.5	optical	4.2
67 506 82 136	1	**2 x WD 962**	93 *(3.66)*	102 *(4.02)*	294 *(11.57)*	22 *(0.87)*	50 *(1.97)*	25	2.5	electrical	4.2
Nominal flow rate up to 100 l/min *(31.7 gpm)* [2]											
67 612 82 116	2	**2 x W 11 102** [1]	108 *(4.25)*	130 *(5.12)*	373 *(14.69)*	53 *(2.09)*	71 *(2.80)*	10	1	–	7.2
67 612 82 146	2	**2 x W 11 102** [1]	108 *(4.25)*	130 *(5.12)*	373 *(14.69)*	53 *(2.09)*	71 *(2.80)*	10	1	electrical	7.3

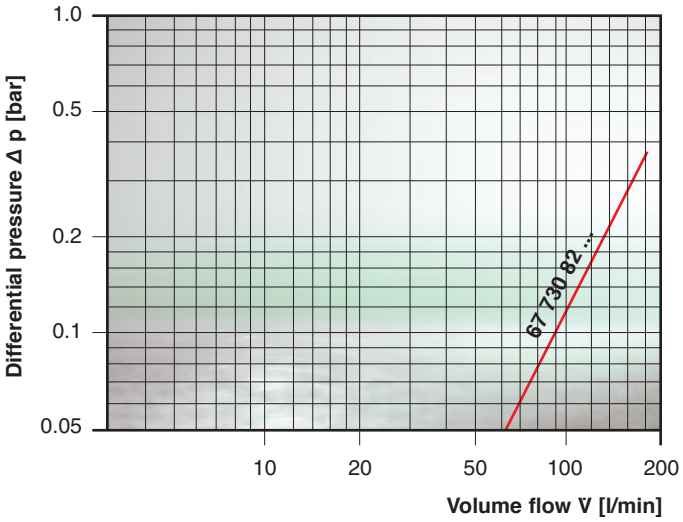
1) With non-return valve.
2) Flow rates are valid for liquids with 36 mm²/s (cSt) and a flow resistance of 0.4 up to 0.6 bar (40 up to 60 kPa). The nominal flow rate per filter half is indicated.
3) Changeover lever spanner size 24, order no. 02 086 01 024.

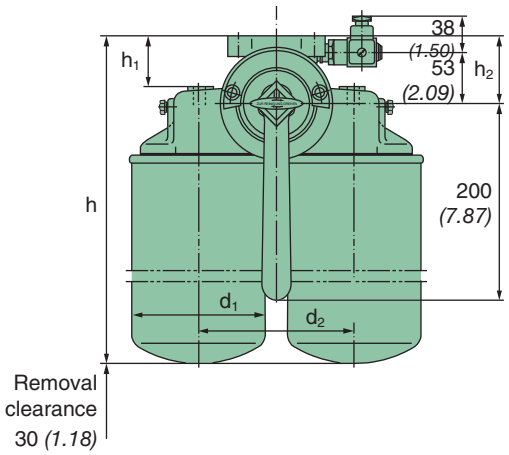
In-line duplex oil filters with changeover

Operating pressure: 20 bar, up to 180 l/min

Characteristics

Flow resistance acc. to ISO 3968 with 36 mm²/s.





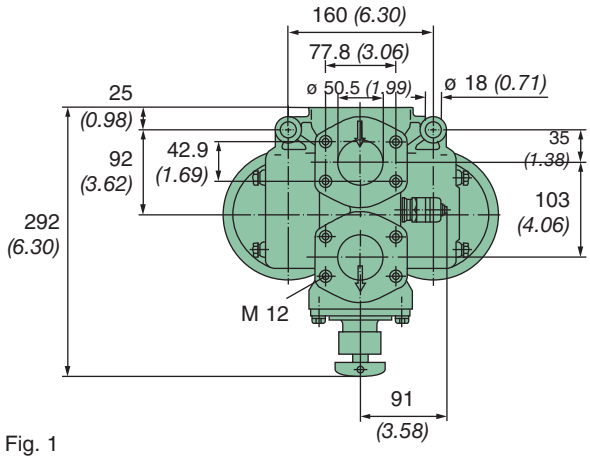


Fig. 1

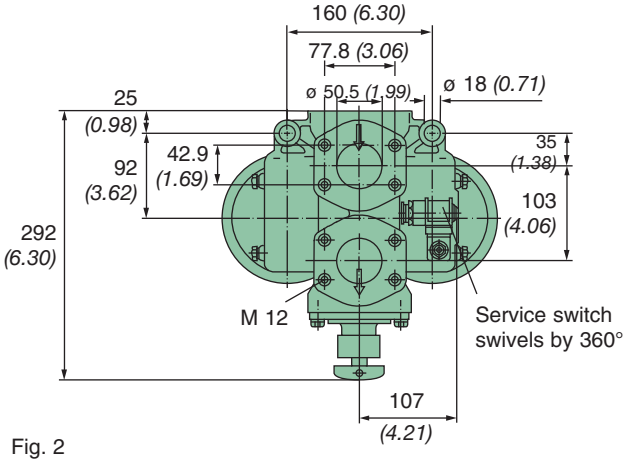


Fig. 2

Part no.	Fig.	MANN-FILTER (see page 13)	Dimensions in mm *(Dimensions in inches)* d_1	d_2	h	h_1	h_2	Permissible operating pressure [bar]	[MPa]	Service indication	Weight approx. [kg]
Nominal flow rate bis 180 l/min *(47.6 gpm)* [2]											
67 730 82 106 [1]	1	**2 x WD 13 145**	136 *(5.35)*	160 *(6.30)*	424 *(16.69)*	52 *(2.05)*	70 *(2.76)*	20	2	–	9.7
67 730 82 126 [1]	1	**2 x WD 13 145**	136 *(5.35)*	160 *(6.30)*	424 *(16.69)*	52 *(2.05)*	70 *(2.76)*	20	2	optical	9.8
67 730 82 116 [1]	2	**2 x WD 13 145**	136 *(5.35)*	160 *(6.30)*	424 *(16.69)*	52 *(2.05)*	70 *(2.76)*	20	2	electrical	9.8

1) On request available with 1 counter flange (with screws and spring washer), order no. 22 078 21 101.

2) Flow rates are valid for liquids with 36 mm²/s (cSt) with a flow resistance of 0.4 up to 0.6 bar (40 up to 60 kPa). The nominal flow rate per filter half is indicated.

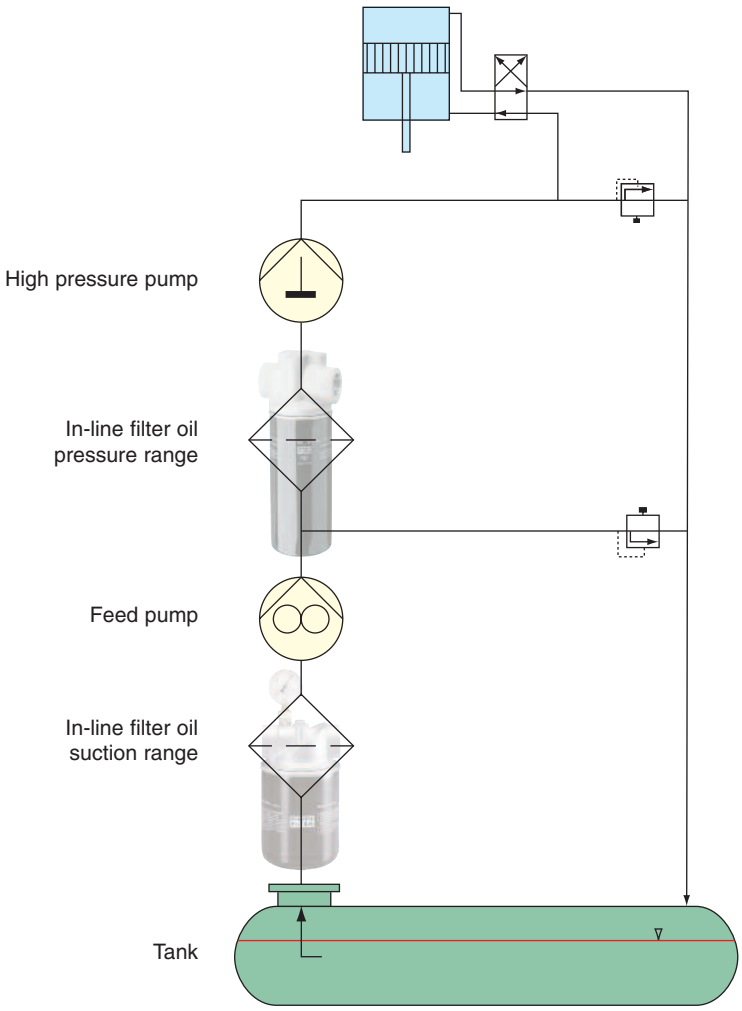
In-line oil filters with single head (suction range)

Operating pressure: 0.8 bar, up to 85 l/min (in-line)

Suction filters are primarily used in hydraulic systems on the suction side of the feed pump. Typical application areas include agricultural machines with their comprehensive mobile hydraulics. Suction filters are designed to achieve a low pressure drop. Filter monitoring is made via the optionally available MANN+HUMMEL low pressure switch or through differential pressure monitoring.

Notes for installation:

- No cross-section constriction of the suction line to the connection on the filter head
- No additional pressure drop such as with fittings and redirected lines



MANN+HUMMEL Oil filter elements

MANN+HUMMEL Oil filter elements

MANN+HUMMEL filter elements are fine filters for lube oils, hydraulic oils and cooling liquids. The elements are characterised by a high surface area relative to volume. This enables a high dirt holding capacity.

The advantages at a glance:

- Consistently high separation efficiency
- High dirt holding capacity of filter elements through high filter surface area
- Pleat structuring allows the complete filter surface area to be effective for the whole of the operating time
- Special impregnation provides resistance to water, coolants and oils up to a temperature of 140 °C
- A variety of versions are available acc. to DIN or ISO standards
- Excellent economy with high utilisation of the machine through re-use of the filter housing on the machine side.

Design

The filter element consists of two end caps with the filter medium fitted in the middle. Depending on the type of element, end caps are available in metal or metal-free versions. The end caps are fitted with seals which ensure reliable sealing between the raw and the clean side. Depending on the application, filter elements are available with element protection through an integrated handle. The flow of liquid through the element takes place from the outside to the inside.

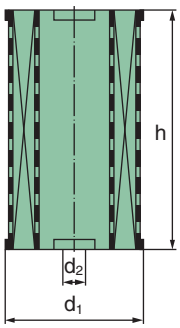
Maintenance

The time when maintenance is required is usually defined by the engine or machine producer. Maintenance simply requires replacement of the used element.

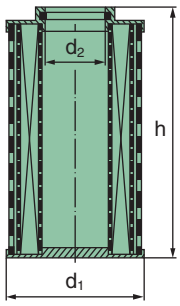
H type

Oil full flow

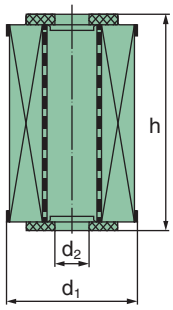
H types are star-pleated filter elements for housings only for use in the full flow of the liquid.



Form A



Form E



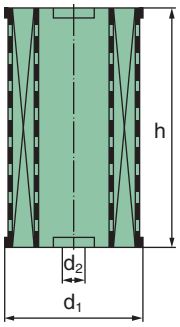
Form B

MANN-FILTER	Nominal flow rate [l/min] *[gpm]*	Dimensions in mm *(Dimensions in inches)* d_1	d_2	h	Filter fineness acc. to ISO 16 889 [µm (c)] * with 50% separation efficiency	99% separation efficiency	Type
H 31/1	0.5 *(0.1)*	30.5 *(1.20)*	8 *(0.32)*	26 *(1.02)*	7	28	E
H 31/2	0.5 *(0.1)*	26 *(1.02)*	8 *(0.32)*	19 *(0.75)*	20	> 50	A
H 42	1.5 *(0.4)*	27.5 *(1.08)*	10 *(0.39)*	51 *(2.01)*	20	> 50	A
H 53	5 *(1.3)*	40 *(1.57)*	12.8 *(0.50)*	64 *(2.52)*	20	> 50	A
H 53/3	5 *(1.3)*	40 *(1.57)*	12.8 *(0.50)*	64 *(2.52)*	20	> 50	A
H 68/1	10 *(2.6)*	59 *(2.32)*	32 *(1.26)*	103 *(4.06)*	20	> 50	E
H 601	17 *(4.5)*	59 *(2.32)*	18 *(0.71)*	101 *(3.98)*	20	> 50	A
H 601/4	17 *(4.5)*	60 *(2.36)*	18 *(0.71)*	101 *(3.98)*	20	> 50	A
H 614/3	18 *(4.8)*	59 *(2.32)*	28.3 *(1.11)*	200 *(7.87)*	15	36	E
H 616/1	20 *(5.3)*	59 *(2.32)*	32 *(1.26)*	189 *(7.44)*	20	> 50	E
H 617 N	21 *(5.5)*	59 *(2.32)*	28.2 *(1.11)*	101 *(3.98)*	20	> 50	A
H 715/1 X	18 *(4.8)*	68 *(2.68)*	20 *(0.79)*	109 *(4.29)*	20	> 50	B

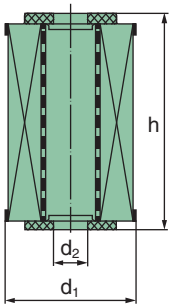
* In comparison to the previously used calibration, the new calibration with the same filter results in a lower filter fineness with small particles.
Other types are available on request.

H type

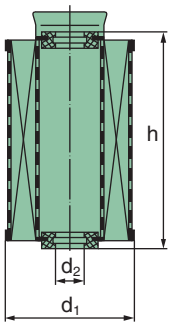
Oil full flow



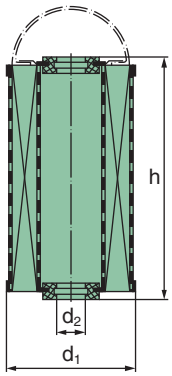
Form A



Form B



Form C



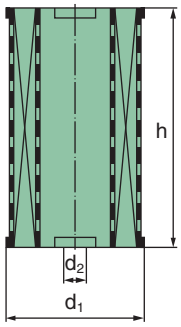
Form D
acc. to DIN 73 358

MANN-FILTER	Nominal flow rate [l/min] *[gpm]*	Dimensions in mm *(Dimensions in inches)* d_1	d_2	h	Filter fineness acc. to ISO 16 889 [µm (c)] * with 50% separation efficiency	99% separation efficiency	Type
H 724/1	30 *(7.9)*	63 *(2.48)*	28.3 *(1.11)*	248 *(9.76)*	< 3	7	D
H 822/1 X	30 *(7.9)*	73 *(2.87)*	26 *(1.02)*	148 *(5.83)*	20	> 50	B
H 829	38 *(10.0)*	72 *(2.83)*	26 *(1.02)*	165 *(6.50)*	20	> 50	A
H 925/2	32 *(8.5)*	81 *(3.19)*	13 *(0.51)*	112 *(4.41)*	7	28	C
H 932/2	40 *(10.6)*	84 *(3.31)*	24.2 *(0.95)*	134 *(5.28)*	15	36	A
H 1081	80 *(21.1)*	100 *(3.94)*	40 *(1.57)*	234 *(9.21)*	20	> 50	A
H 1273	95 *(25.1)*	118 *(4.65)*	59 *(2.32)*	163 *(6.42)*	20	> 50	B
H 1275 X	145 *(38.3)*	120 *(4.72)*	56 *(2.20)*	171 *(6.73)*	14	38	B
H 1282 X	160 *(42.3)*	117 *(4.61)*	56 *(2.20)*	196 *(7.72)*	14	38	A
H 1290/1	100 *(26.4)*	118 *(4.65)*	59 *(2.32)*	165 *(6.50)*	20	> 50	B
H 11 171	85 *(22.5)*	110 *(4.33)*	48 *(1.89)*	452 *(17.80)*	15	36	B
H 12 107/1	160 *(42.3)*	117 *(4.61)*	56 *(2.20)*	196 *(7.72)*	14	38	A

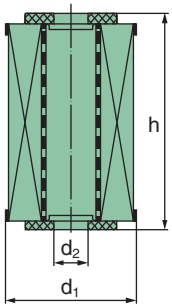
* In comparison to the previously used calibration, the new calibration with the same filter results in a lower filter fineness with small particles.
Other types are available on request.

H type

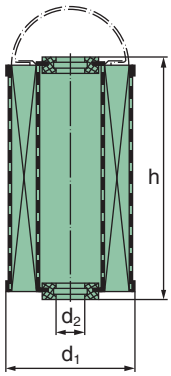
Oil full flow



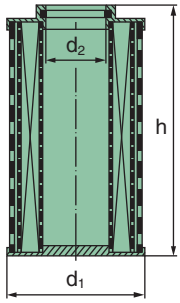
Form A



Form B



Form D
acc. to DIN 73 358



Form E

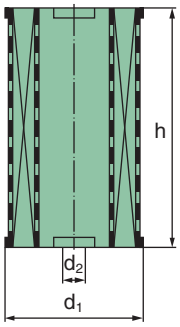
MANN-FILTER	Nominal flow rate [l/min] *[gpm]*	Dimensions in mm *(Dimensions in inches)* d_1	d_2	h	Filter fineness acc. to ISO 16 889 [µm (c)] * with 50% separation efficiency	99%	Type
H 12 113	110 *(29.1)*	117 *(4.61)*	43 *(1.69)*	229 *(9.02)*	20	> 50	A
H 12 110/2 X	145 *(38.3)*	120 *(4.72)*	56 *(2.20)*	249 *(9.80)*	14	38	B
H 12 225	121 *(32.0)*	117 *(4.61)*	56.5 *(2.22)*	462 *(18.19)*	24	50	B
H 13 104	50 *(13.2)*	126 *(4.96)*	40 *(1.69)*	290 *(11.42)*	20	> 50	A
H 15 111/2	200 *(52.8)*	150 *(5.91)*	88 *(3.46)*	165 *(6.50)*	24	50	A
H 15 206/1	200 *(52.8)*	150 *(5.91)*	31 *(1.22)*	375 *(14.76)*	20	> 50	E
H 15 222/2	270 *(71.3)*	150 *(5.91)*	88 *(3.46)*	330 *(12.99)*	24	50	A
H 15 230/1	230 *(60.8)*	150 *(5.91)*	31 *(1.22)*	375 *(14.76)*	15	36	E
H 15 250/1	250 *(66.1)*	150 *(5.91)*	31 *(1.22)*	375 *(14.76)*	7	28	E
H 20 211	390 *(103.0)*	194 *(7.64)*	118 *(4.65)*	183 *(7.20)*	24	50	B
H 20 440	495 *(130.8)*	194 *(7.64)*	118 *(4.65)*	366 *(14.41)*	24	50	B
H 25 669/1	850 *(224.6)*	242 *(5.93)*	132 *(5.20)*	366 *(14.41)*	11	28	A
H 28 545	675 *(178.3)*	274 *(10.79)*	195 *(7.68)*	304 *(11.97)*	24	50	B

* In comparison to the previously used calibration, the new calibration with the same filter results in a lower filter fineness with small particles.
Other types are available on request.

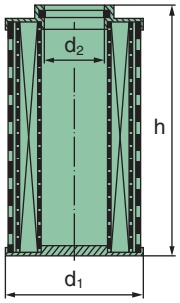
HD type

Oil full flow – For higher pressures

HD types are oil filter elements designed for higher pressures and especially suitable for hydraulic applications.



Form A

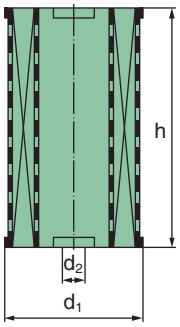


Form E

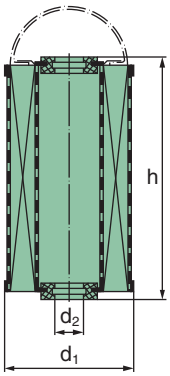
MANN-FILTER	Nominal flow rate [l/min] *[gpm]*	Dimensions in mm *(Dimensions in inches)*			$ß_x \geq 200$	Differential pressure stability of the filter element	Type
		d_1	d_2	h	x	[bar]	
HD 45	30 *(7.93)*	35 *(1.38)*	12.2 *(0.48)*	94 *(3.70)*	15	30	E
HD 46	25 *(6.6)*	40 *(1.57)*	18 *(0.71)*	122 *(4.80)*	23	10	E
HD 46/1	20 *(5.3)*	40 *(1.57)*	18 *(0.71)*	122 *(4.80)*	5	60	E
HD 46/2	25 *(6.6)*	40 *(1.57)*	18 *(0.71)*	122 *(4.80)*	8	10	E
HD 46/3	25 *(6.6)*	40 *(1.57)*	18 *(0.71)*	122 *(4.80)*	8	60	E
HD 56	60 *(15.85)*	47 *(1.85)*	22.2 *(0.87)*	84 *(3.31)*	8	30	E
HD 57/3	50 *(13.21)*	47 *(1.85)*	25.5 *(1.00)*	94 *(3.70)*	5	210	A
HD 57/2	50 *(13.21)*	47 *(1.85)*	25.5 *(1.00)*	94 *(3.70)*	17.5	20	A
HD 58	40 *(10.57)*	45 *(1.77)*	25.8 *(1.02)*	112.5 *(4.43)*	8	160	E
HD 65	60 *(15.85)*	57 *(2.24)*	25 *(0.98)*	71 *(2.80)*	23	45	E
HD 65/1	35 *(9.24)*	57 *(2.24)*	25 *(0.98)*	71 *(2.80)*	5	180	E
HD 65/2	45 *(11.88)*	57 *(2.24)*	25 *(0.98)*	71 *(2.80)*	8	15	E
HD 68	40 *(10.57)*	55.5 *(2.19)*	28.7 *(1.13)*	136 *(5.35)*	10	30	E

HD type

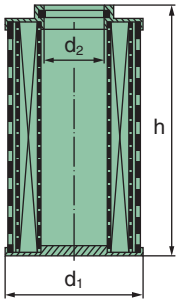
Oil full flow – For higher pressures



Form A



Form D
acc. to DIN 73 358

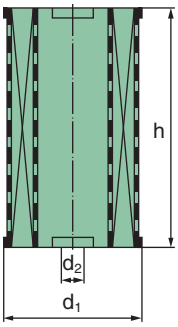


Form E

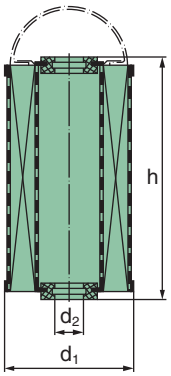
MANN-FILTER	Nominal flow rate [l/min] *[gpm]*	Dimensions in mm *(Dimensions in inches)* d_1	d_2	h	$ß_x \geq 200$ x	Differential pressure stability of the filter element [bar]	Type
HD 69	90 *(23.78)*	55 *(2.17)*	25.5 *(1.00)*	101 *(3.98)*	10	15	E
HD 513	80 *(21.14)*	47 *(1.85)*	25.5 *(1.00)*	172 *(6.77)*	10	20	A
HD 513/3	80 *(21.14)*	47 *(1.85)*	25.5 *(1.00)*	172 *(6.77)*	5	210	A
HD 518	110 *(29.06)*	47 *(1.85)*	25.5 *(1.00)*	249 *(9.80)*	10	20	A
HD 610	100 *(26.42)*	57 *(2.24)*	25 *(0.98)*	124 *(4.88)*	23	45	E
HD 610/1	50 *(13.21)*	57 *(2.24)*	25 *(0.98)*	124 *(4.88)*	5	180	E
HD 610/2	70 *(18.49)*	57 *(2.24)*	25 *(0.98)*	124 *(4.88)*	8	15	E
HD 613	125 *(33)*	57 *(2.24)*	25 *(0.98)*	171 *(6.73)*	23	45	E
HD 613/1	60 *(15.85)*	57 *(2.24)*	25 *(0.98)*	171 *(6.73)*	5	180	E
HD 613/2	85 *(22.45)*	57 *(2.24)*	25 *(0.98)*	171 *(6.73)*	8	15	E
HD 620	75 *(19.82)*	56.5 *(2.22)*	25.7 *(1.01)*	170 *(6.69)*	5	30	E
HD 751	280 *(73.98)*	69 *(2.72)*	34.2 *(1.35)*	356 *(14.02)*	10	30	E
HD 829	240 *(63.41)*	74 *(2.91)*	20 *(0.79)*	203 *(7.99)*	10	30	D

HD type

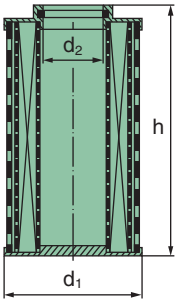
Oil full flow – For higher pressures



Form A



Form D
acc. to DIN 73 358



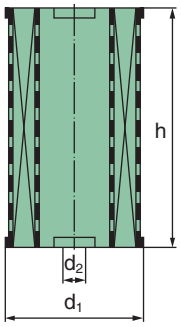
Form E

MANN-FILTER	Nominal flow rate [l/min] *[gpm]*	Dimensions in mm *(Dimensions in inches)* d_1	d_2	h	$\beta_x \geq 200$ x	Differential pressure stability of the filter element [bar]	Type
HD 929/3	150 *(39.63)*	82.5 *(3.25)*	47.5 *(1.87)*	142 *(5.59)*	5	20	A
HD 929	150 *(39.63)*	82.5 *(3.25)*	47.5 *(1.87)*	142 *(5.59)*	10	20	A
HD 938	300 *(79.26)*	85 *(3.35)*	46 *(1.81)*	200 *(7.87)*	37	45	E
HD 938/1	250 *(66.05)*	85 *(3.35)*	46 *(1.81)*	200 *(7.87)*	8	180	E
HD 938/2	200 *(52.84)*	85 *(3.35)*	46 *(1.81)*	200 *(7.87)*	20	15	E
HD 958	450 *(118.89)*	85 *(3.35)*	46 *(1.81)*	300 *(11.81)*	37	45	E
HD 958/1	350 *(92.47)*	85 *(3.35)*	46 *(1.81)*	300 *(11.81)*	8	180	E
HD 958/2	280 *(73.97)*	85 *(3.35)*	46 *(1.81)*	300 *(11.81)*	20	15	E
HD 952	300 *(79.26)*	82.5 *(3.25)*	47.5 *(1.87)*	257 *(10.12)*	9	20	A
HD 952/2	300 *(79.26)*	82.5 *(3.25)*	47.5 *(1.87)*	257 *(10.12)*	17	20	A
HD 1060	500 *(132.10)*	94 *(3.72)*	48.5 *(1.91)*	256 *(10.87)*	10	30 (Bypass +/- 3 bar)	D
HD 1066	660 *(174.37)*	90.5 *(3.569)*	48.5 *(1.91)*	329 *(12.95)*	10	30	E
HD 12 112	850 *(224.57)*	114 *(4.49)*	68.2 *(2.69)*	414 *(16.30)*	10	30	D

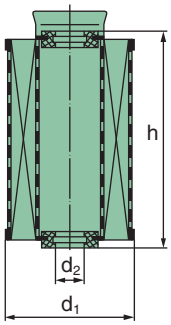
HU type

Oil full flow

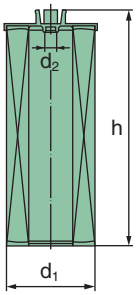
HU types have oil filter elements which are metal-free and are particularly environmentally friendly. After use they can be incinerated without leaving any residue



Form A



Form C



Form F

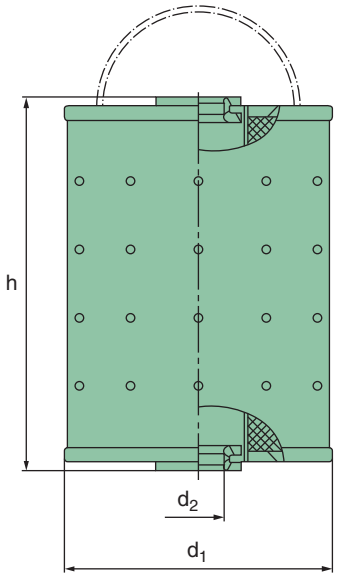
MANN-FILTER	Nominal flow rate [l/min] *[gpm]*	Dimensions in mm *(Dimensions in inches)* d_1	d_2	h	Filter fineness acc. to ISO 16 889 [µm (c)] * with 50% separation efficiency	99% separation efficiency	Type
HU 718/1 K	34 *(8.98)*	63.5 *(2.50)*	31 *(1.22)*	115 *(4.53)*	14	38	A
HU 726/2 X	47 *(12.42)*	64 *(2.52)*	25 *(0.98)*	153 *(6.02)*	14	38	A
HU 921 X	27 *(7.13)*	81 *(3.19)*	36.5 *(1.44)*	88.5 *(3.48)*	20	> 50	C
HU 932/4 X	60 *(15.85)*	78 *(3.07)*	23 *(0.91)*	133 *(5.24)*	14	38	A
HU 931/5 X	61 *(16.11)*	80 *(3.15)*	39 *(1.54)*	138 *(5.43)*	14	38	F
HU 947/1 X	91 *(24.04)*	78 *(3.07)*	23 *(0.91)*	135 *(5.32)*	14	38	A
HU 945/2 X	90 *(23.77)*	82 *(3.23)*	39 *(1.54)*	200 *(7.87)*	14	38	F
HU 951 X	83 *(21.92)*	82.6 *(3.25)*	36 *(1.42)*	169 *(6.65)*	14	38	A
HU 12 140 X	182 *(48.08)*	118 *(4.65)*	55.8 *(2.20)*	312.5 *(12.30)*	14	38	F

* In comparison to the previously used calibration, the new calibration with the same filter results in a lower filter fineness with small particles.

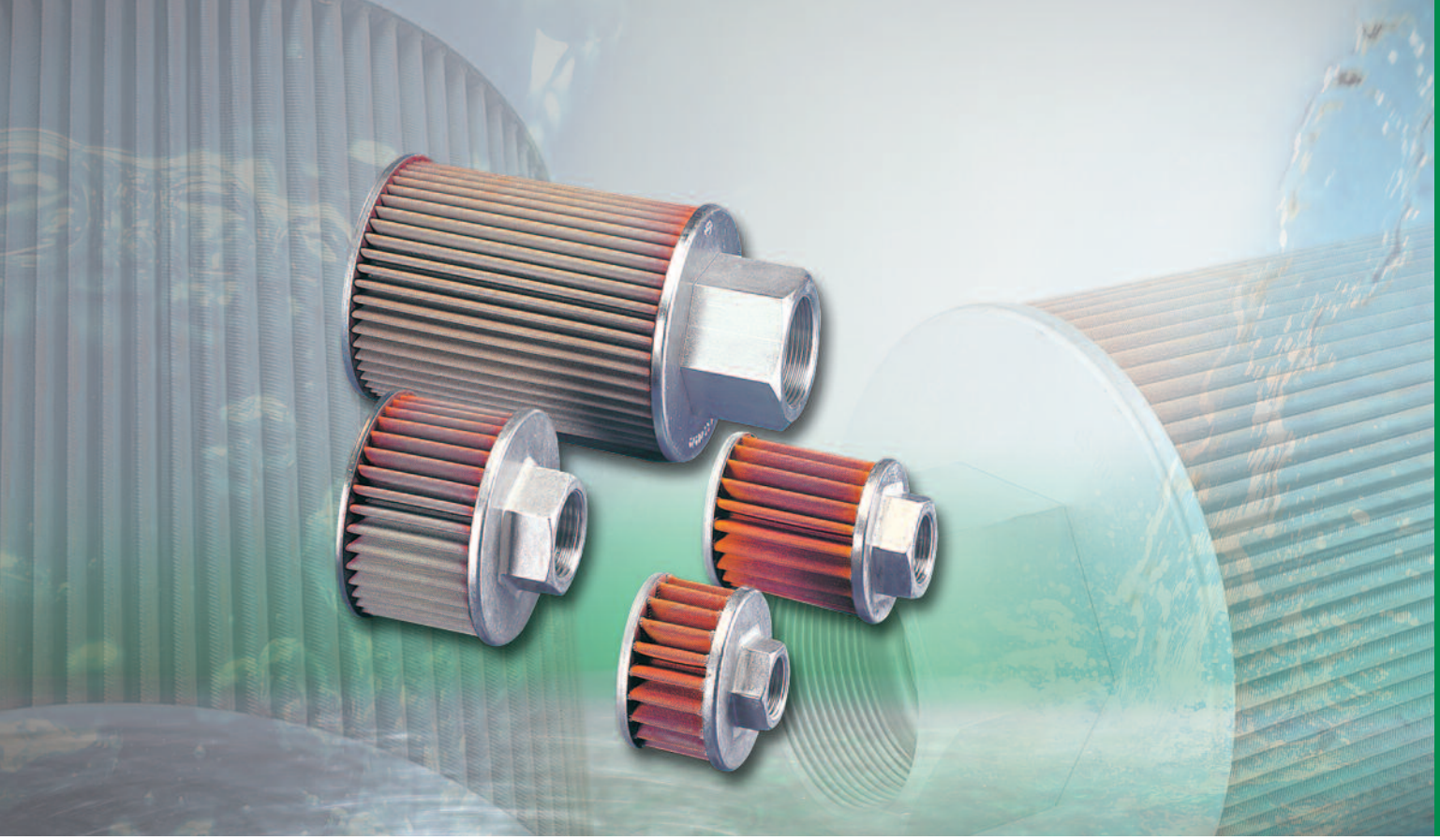
PF type

Oil partial flow

PF types are mainly partial-flow filters for oil.



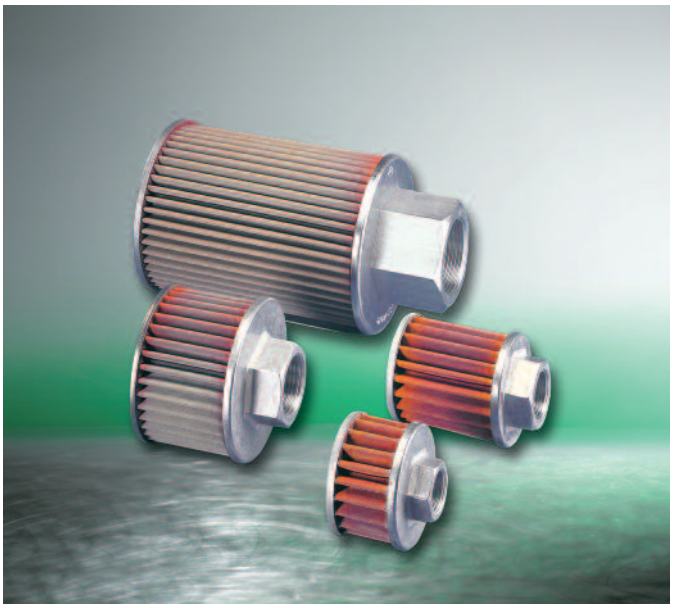
MANN-FILTER	Filling volume [cm³]	Dimensions in mm *(Dimensions in inches)* d_1	d_2	h	Code according to DIN 71 455
PF 815	310	75 *(2.95)*	14 *(0.55)*	104 *(4.09)*	–
PF 915	520	90 *(3.54)*	14 *(0.55)*	110 *(4.33)*	–
PF 926	630	98 *(3.86)*	14 *(0.55)*	110 *(4.33)*	–
PF 1025	1300	98 *(3.86)*	14 *(0.55)*	206 *(8.11)*	–
PF 1050/1	580	90 *(3.54)*	24 *(0.94)*	169 *(6.65)*	–
PF 1055/1	685	90 *(3.54)*	24 *(0.94)*	196 *(7.72)*	–
PF 1155	950	110 *(4.33)*	14 *(0.55)*	125 *(4.92)*	DIN 71 455 - E 1.5
PF 1190	1600	110 *(4.33)*	14 *(0.55)*	202 *(7.95)*	DIN 71 455 - E 2.5
PF 1552	5500	150 *(5.91)*	32 *(1.26)*	367 *(14.88)*	DIN 71 455 - E 8



MANN+HUMMEL Strainer filters

MANN+HUMMEL Strainer filters

These are surface-type filters. They are reasonably priced, robust and are excellently suited to high dirt particle loads and the separation of coarse particles. These strainer filters are designed to be suction filters for installation in tanks or for suction from a reservoir. Strainer filters with a filter housing are fitted as in-line filters in the pipeline.



The advantages at a glance:

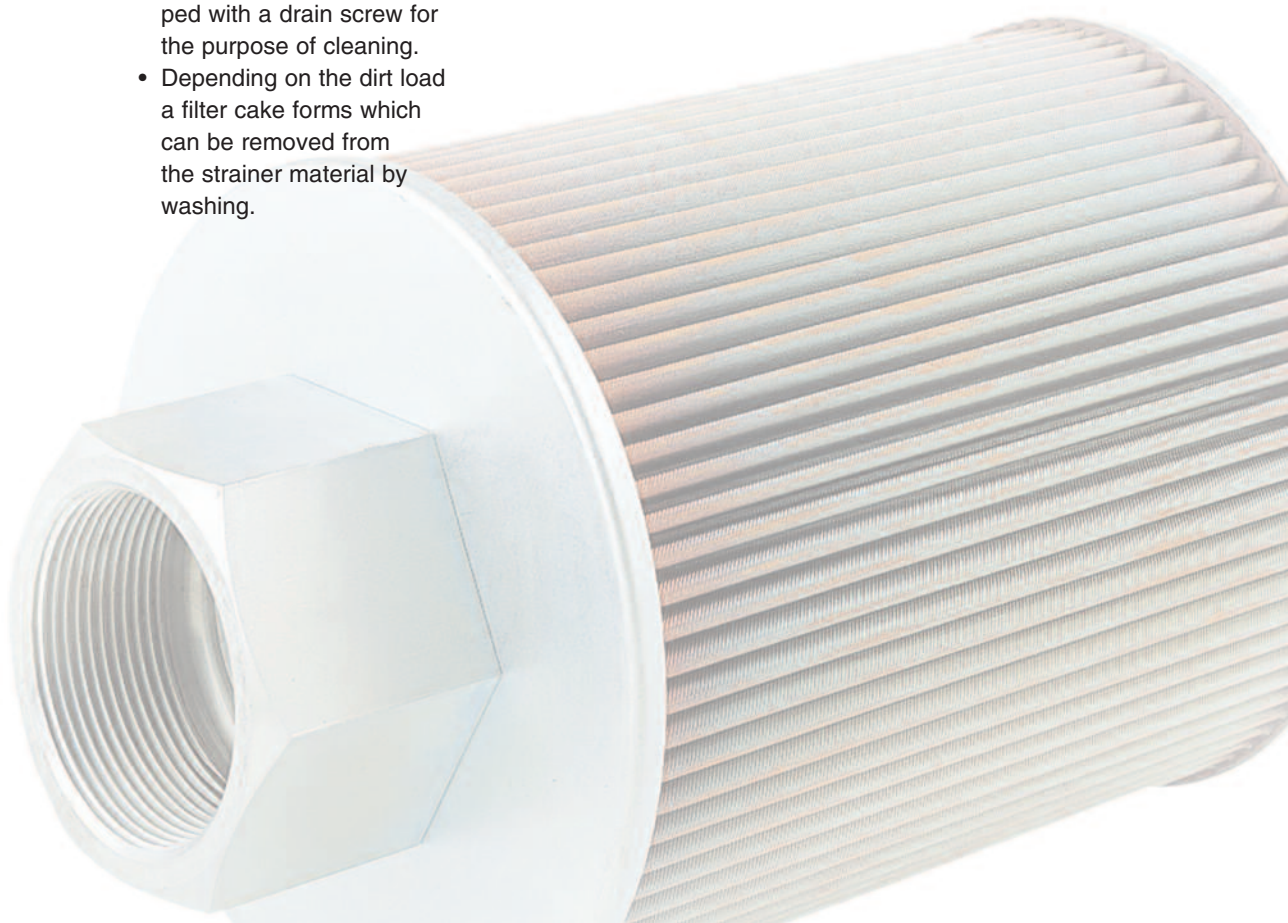
- Excellent as a preliminary filter
- Suction filter for the protection of components fitted downstream
- Various levels of filter fineness available on request
- Low flow resistance
- Suitable for use with highly viscous liquids
- Easy to fit
- Low maintenance

Design

The strainer material is located between robust metal end caps. The strainer material used with strainer filters listed in the catalogue is star-pleated in order to maximise the surface area. The flow is from the inside to the outside.

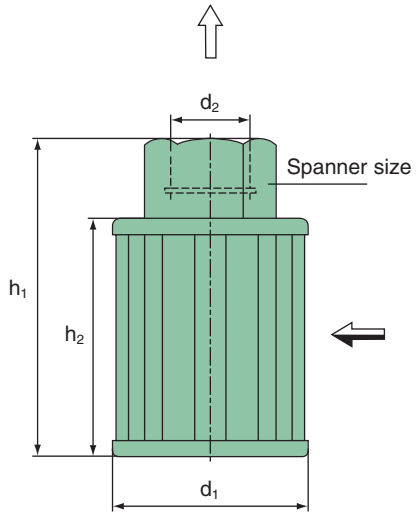
Fitting and maintenance

- Suction filters are screwed directly to the connections of the feed pump or to an appropriate suction pipe.
- When using a housing the filter is screwed in-line on the raw and clean side in the pipeline.
- Housing filters are equipped with a drain screw for the purpose of cleaning.
- Depending on the dirt load a filter cake forms which can be removed from the strainer material by washing.



Strainer filters

Suction filters for use in tanks



Part no.	Nominal flow rate [l/min] *[gpm]*	Dimensions in mm *(Dimensions in inches)*					Mesh size [µm]
		d_1	d_2	h_1	h_2	SW	
62 300 52 551	20 *(5.28)*	61 *(2.40)*	G 1/2”	55 *(2.17)*	42 *(1.65)*	27 *(1.06)*	63
62 300 53 571	30 *(7.93)*	61 *(2.40)*	G 1/2”	84 *(3.31)*	71 *(2.80)*	27 *(1.06)*	100
62 300 52 541	30 *(7.93)*	61 *(2.40)*	G 3/4”	87 *(3.43)*	70 *(2.76)*	36 *(1.42)*	63
62 500 53 411	45 *(11.89)*	87 *(3.43)*	G 1”	85 *(3.35)*	63 *(2.48)*	41 *(1.61)*	100
62 501 52 281	60 *(15.85)*	87 *(3.43)*	G 1”	105 *(4.13)*	84 *(3.31)*	41 *(1.61)*	63
62 501 53 281	60 *(15.85)*	87 *(3.43)*	G 1”	105 *(4.13)*	84 *(3.31)*	41 *(1.61)*	100
62 501 53 291	80 *(21.14)*	87 *(3.43)*	G 1”	155 *(6.10)*	134 *(5.28)*	41 *(1.61)*	100
62 602 53 251	120 *(31.70)*	110 *(4.33)*	G 1 1/2”	165 *(6.50)*	120 *(4.72)*	60 *(2.36)*	100
62 602 53 261	150 *(39.63)*	110 *(4.33)*	G 1 1/2”	205 *(8.07)*	160 *(6.30)*	60 *(2.36)*	100

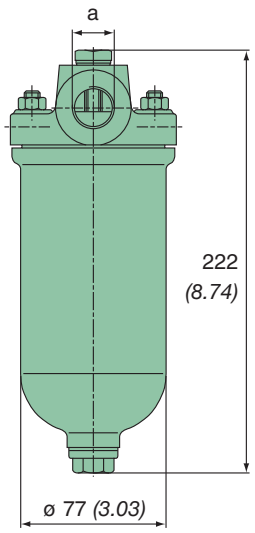
Further types available on request.

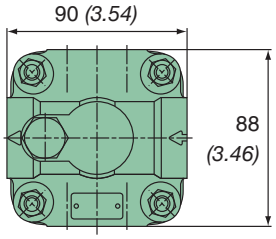
Strainer filters

Housing filters for coarse particle filtration of oils

These strainer filters with housings in cast iron are designed to handle pressures of between 10 and 40 bar. They are particularly suitable for the filtration of oils such as heating oil, heavy oil or lube oil.

The housing can be fitted with strainers of varying mesh sizes and materials. Your MANN+HUMMEL contact partner will be happy to advise you on the best choice for your application.



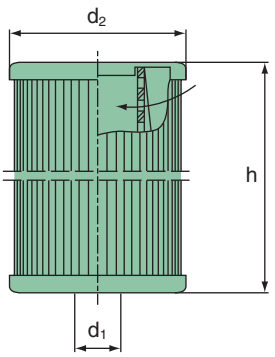


Part no.	Nominal flow rate [l/min] *[gpm]*	Permissible operating pressure [bar]	Bypass valve [bar]	Mesh size [µm]	Connection dimension a
62 301 63 121	50 *(13.21)*	10	–	100	M 26x1.5
62 301 62 111	50 *(13.21)*	40	4	63	M 26x1.5
61 402 62 031	100 *(26.42)*	10	4	63	M 22x1.5
61 402 61 032 *	100 *(26.42)*	10	4	40	M 22x1.5

* Strainer in stainless steel

Filter elements for customer housings

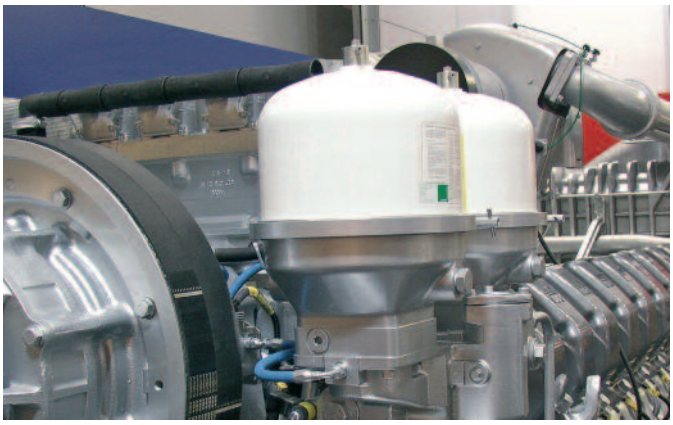
Part no.	Dimensions in mm *(Dimensions in inches)* d_1	d_2	h	Mesh size [µm]
62 300 53 285	24 *(0.94)*	60 *(2.36)*	25 *(0.98)*	100
62 300 52 591	29 *(1.14)*	60 *(2.36)*	71 *(2.80)*	63
62 301 52 171	29 *(1.14)*	60 *(2.36)*	112 *(4.41)*	63
62 501 57 362	29 *(1.14)*	85 *(3.35)*	82 *(3.23)*	40



MANN+HUMMEL Centrifuges

MANN+HUMMEL Centrifuges

MANN+HUMMEL is the market leader worldwide for centrifuges. This product range provides high performance filtration solutions for partial-flow oil. The MANN+HUMMEL centrifuges efficiently separate dirt particles such as soot particles and particles resulting from the abrasion of metal in lube oils in diesel engines. This technology is also suitable and efficient for gearboxes, hydraulic systems and other industrial applications.



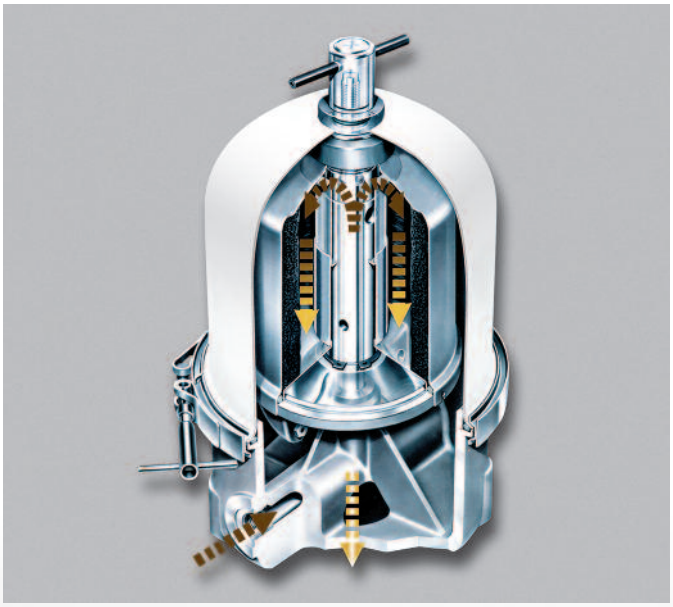
The advantages at a glance:

- Improved purity of the oil
- Extended oil service life
- Longer service intervals
- Reduced engine wear
- Preventative engine protection
- Reduced maintenance costs
- Lower disposal costs
- Less engine down-times
- Maximum availability for vehicles, engines and machines
- Lower running costs in total
- Improved combustion process and reduced fuel consumption
- Supports systems to minimise exhaust emissions (e.g. exhaust gas recirculation)
- An investment which quickly pays for itself

Function

Oil is pumped into the centrifuge and directed into a hollow spindle from where it is pressed through a cross-hole into the rotor of the centrifuge. When the rotor is full of oil the resulting pressure forces it out through two tangential and opposite nozzles in the bottom of the rotor.

This causes the rotor to rotate quickly. The centrifugal force in the rotor causes the dirt particles present accelerate radially and deposit on the internal wall of the rotor. In the course of operation these deposits form a thick cake.



Installation instructions

A MANN+HUMMEL centrifuge is either integrated in the engine concept of the OEM product or can be retrofitted by the end user to existing engines. The partial-flow centrifuge requires a supply of oil under pressure. In most applications the oil feed is achieved using normal engine pressure and via the lube oil pump. If the oil pressure is insufficient, a supplementary pump can be fitted.

The deviation between the longitudinal and vertical axis of the centrifuge should not exceed 15°. A greater degree of inclination occurring temporarily through operation of the engine can be ignored. MANN+HUMMEL can adapt the centrifuge specifications for special applications which require a greater degree of inclination.

Gravity allows the oil to return from the centrifuge to the oil sump without pressure. Therefore the oil return must be above the oil level. The oil return pipe must have a sufficiently large internal diameter and as low a resistance as possible.

In the process of dimensioning a centrifuge for an engine application it is essential that the lube oil system of the engine has sufficient reserves to ensure the additional oil requirement for the operation of the partial-flow centrifuge. This must not compromise the amount of lubrication required for the engine components. In most cases the engine oil pump has enough power to operate a partial-flow centrifuge if it is correctly dimensioned for the respective engine. Your MANN+HUMMEL contact partner will be happy to advise you on the choice and installation of an oil centrifuge.

In cases where the retrofitting of a centrifuge directly to the engine is difficult or impossible, MANN+HUMMEL offers solutions for an external fitting solution where the oil return flow to the oil sump is made using compressed air. This means a permanent supply of compressed air is required.

Overview of the MANN+HUMMEL centrifuges

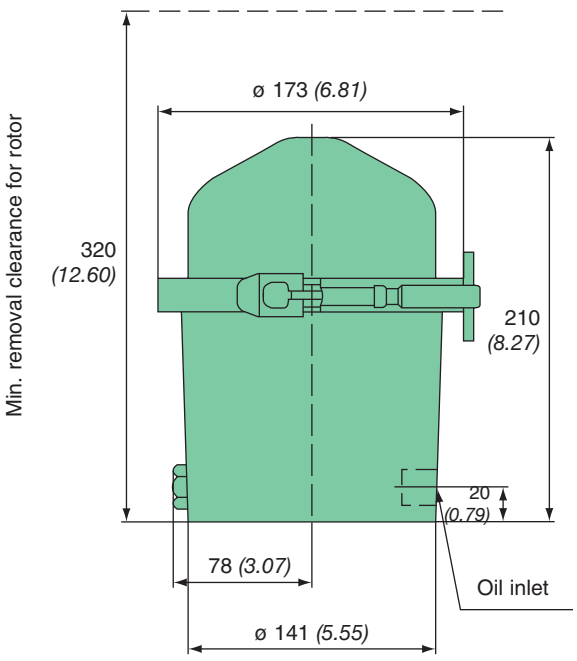
Sizes	FM 090		FM 200			
Type	FM 090-31	FM 090-LCB	FM 200-21	FM 200-22	FM 200-25	FM 200-28
Part no.	**68 991 42 101**	**68 991 39 301**	**68 991 19 701**	**68 991 19 801**	**68 991 19 901**	**68 991 20 001**
For oil sump volume from/to [l]	15 / 90	15 / 90	40 / 170	40 / 170	40 / 170	40 / 170
Connection for oil inlet	3/8" BSP	1/2" NPT	1/2" BSP	7/8" UNF	M 22x1.5	M 22x1.5
Smallest internal diameter Oil feed pipe [mm]	9.5	–	12	12	12	12
Smallest internal diameter Oil outlet pipe [mm]	38	12	50	50	50	50
Mounting holes for threads	–	–	M 12	1/2" UNC	M 12	M 12
Air inlet connection	1/2" NPT	1/4" NPT	–	–	–	–
Max. air requirement [l/h]	–	36	–	–	–	–
Rotor dirt holding capacity [l]	0.9	0.9	2.0	2.0	2.0	2.0
Rotor oil volume [l]	1.125	1.125	2.3	2.3	2.3	2.3
Switch-off valve [bar]	1.3	1.3	2.5	2.1	2.5	2.1
Empty weight approx. [kg]	3.5	6.0	9.5	9.5	9.5	9.5

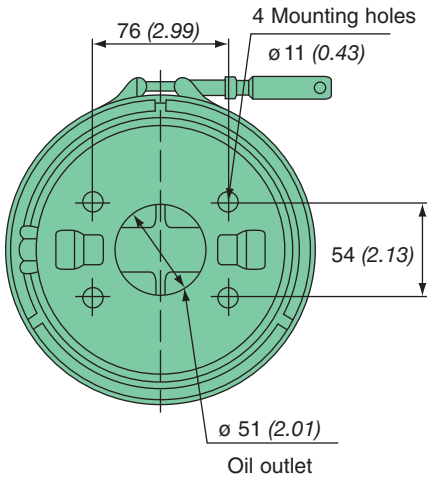
Sizes	FM 400			
Type	FM 400-21	FM 400-23	FM 400-24	FM 400-26
Part no.	**68 991 34 401**	**68 991 38 801**	**68 991 36 801**	**68 991 34 701**
For oil sump volume from/to [l]	200 / 1500	200 / 1500	200 / 1500	200 / 1500
Connection for oil inlet	3/4" BSP	3/4" BSP	5/16" BSP	M 27x1.5
Smallest internal diameter Oil feed pipe [mm]	19	19	19	19
Smallest internal diameter Oil outlet pipe [mm]	76	76	76	76
Mounting holes for threads	M 12	M 12	1/2" UNC	M 12
Air inlet connection	–	–	–	–
Max. air requirement [l/h]	–	–	–	–
Rotor dirt holding capacity [l]	4.0	4.0	4.0	4.0
Rotor oil volume [l]	4.5	4.5	4.5	4.5
Switch-off valve [bar]	–	2.5	2.5	2.5
Empty weight approx. [kg]	22	22	22	22

Sizes	FM 600					
Type	FM 600-21	FM 600-22	FM 600-23	FM 600-24	FM 600-25	FM 600-26
Part no.	**68 991 18 701**	**68 991 18 801**	**68 991 18 901**	**68 991 19 001**	**68 991 19 201**	**68 991 19 301**
For oil sump volume from/to [l]	200 / 1500	200 / 1500	200 / 1500	200 / 1500	200 / 1500	200 / 1500
Connection for oil inlet	3/4" BSP	3/4" BSP	3/4" BSP	15/16" UNF	3/4" NPT	M 27x1.5
Smallest internal diameter Oil feed pipe [mm]	19	19	19	19	19	19
Smallest internal diameter Oil outlet pipe [mm]	76	76	76	76	76	76
Mounting holes for threads	M 12	M 12	M 12	1/2" UNC	1/2" UNC	M 12
Air inlet connection	–	–	–	–	–	–
Max. air requirement [l/h]	–	–	–	–	–	–
Rotor dirt holding capacity [l]	6.0	6.0	6.0	6.0	6.0	6.0
Rotor oil volume [l]	6.5	6.5	6.5	6.5	6.5	6.5
Switch-off valve [bar]	–	3.5	2.5	2.5	2.5	2.5
Empty weight approx. [kg]	25	25	25	25	25	25

FM 090 Centrifuge

- Suitable for engine oil volumes of 15 up to 90 litres
- Dirt holding capacity of the rotor: 0.9 litres
- Oil capacity of the rotor: 1.125 litres
- Internal diameter of the oil feed pipe: min. 9.5 mm
- Internal diameter of the oil return pipe: min. 38 mm
- This model is available with a cleanable rotor. The rotor is equipped with a paper insert (part no. 68 933 30 101) for simpler maintenance.
- Additional options according to customer specifications are available on request
- Empty weight: approx. 3.5 kg

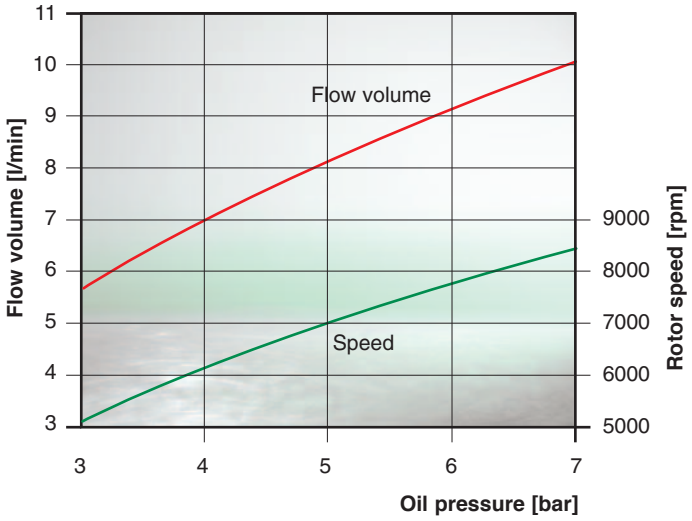




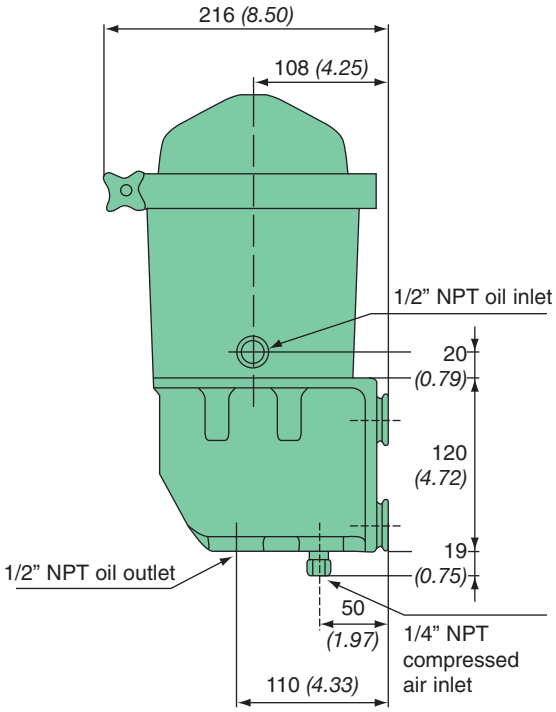
Part no.	Type	Connection thread oil inlet	Switching pressure shut-off valve [bar]
68 991 42 101	FM 090-31	3/8" BSP	1.3

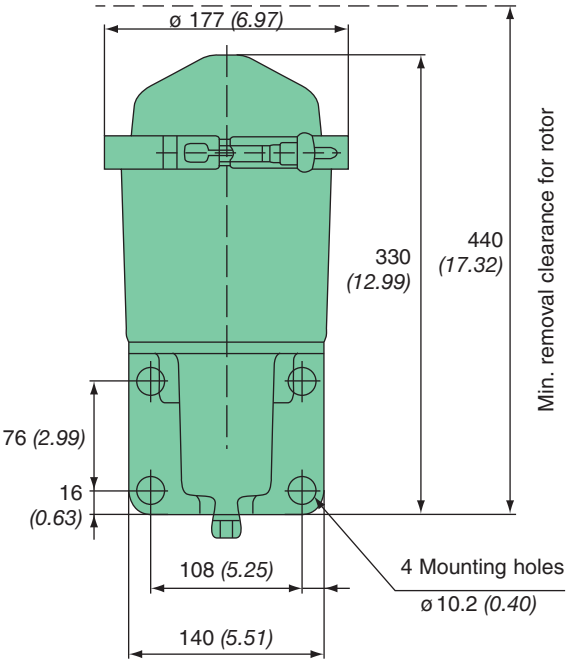
Characteristics

Typical rotor output for SAE 30 oil at 100 °C



FM 090-LCB Centrifuge



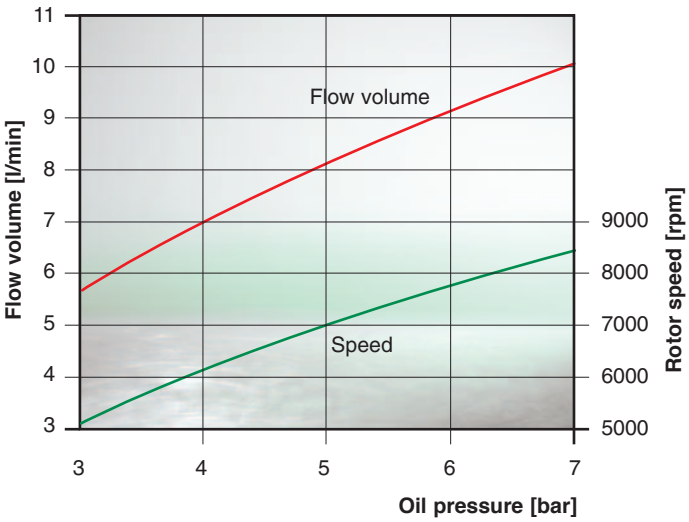


- Integrated mounting plate for external mounting away from the engine
- Suitable for engine oil volumes from 15 up to 90 litres
- Dirt holding capacity of the rotor: 0.9 litre
- Oil capacity of the rotor: 1.125 litres
- Internal diameter of the oil return pipe: min. 12 mm
- Compressed air consumption: max. 36 l/h. This model is available with a cleanable rotor. The rotor is equipped with a paper insert (part no. 68 933 30 101) for simpler maintenance.
- Empty weight: approx. 6 kg

Part no.	Type	Connection thread oil pipe	Connection thread compressed air	Switching pressure shut-off valve [bar]
68 991 39 301	FM 090-LCB Transit	1/2" NPT	1/4" NPT	1.3

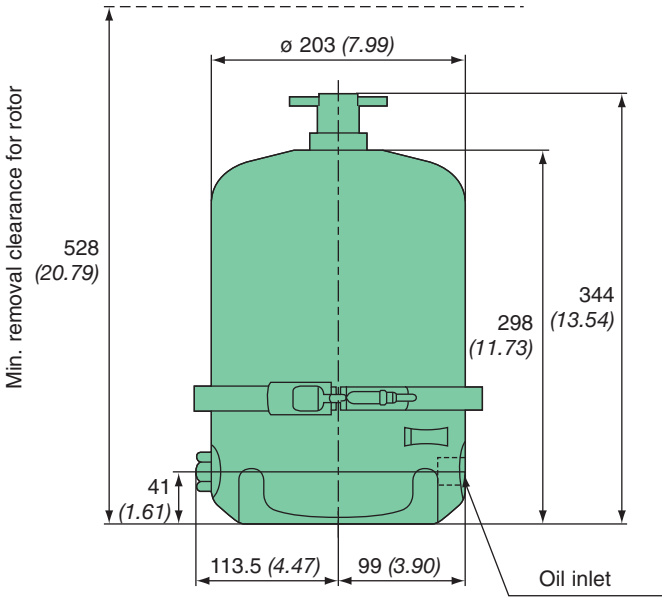
Characteristics

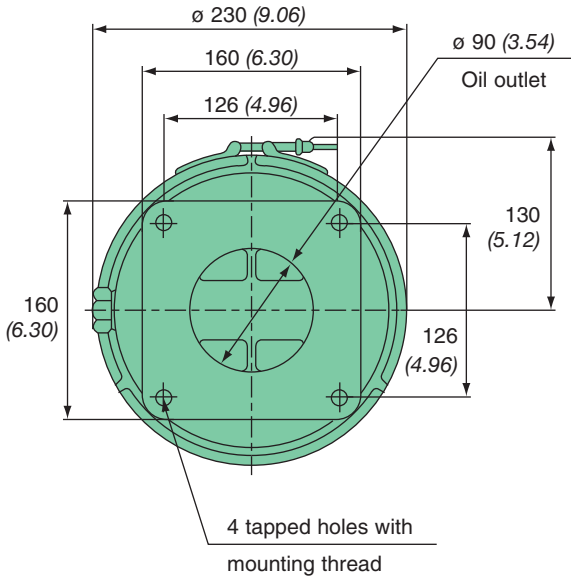
Typical rotor output for SAE 30 oil at 100 °C



FM 200 Centrifuge

- Suitable for engine oil volumes between 40 and 170 litres
- Dirt holding capacity of the rotor: 2 litres
- Oil capacity of the rotor: 2.3 litres
- Internal diameter of the oil feed pipe: min. 12 mm
- Internal diameter of the oil return pipe: min. 50 mm
- This model is available with a cleanable rotor. The rotor is equipped with a paper insert (part no. 68 903 22 001) for simpler maintenance.
- The inlet thread and shut-off valve can be matched to customer specifications.
- The following accessories are available for this centrifuge:
  - A mounting plate is available for external fitting away from the engine with compressed-air driven oil return (part no. 68 999 11 101).
  - A release tool for removing the rotor (part no. 68 906 90 601)
  - A pulling-off device for the central tube (part no. 68 906 90 901)
- Empty weight: approx. 9.5 kg

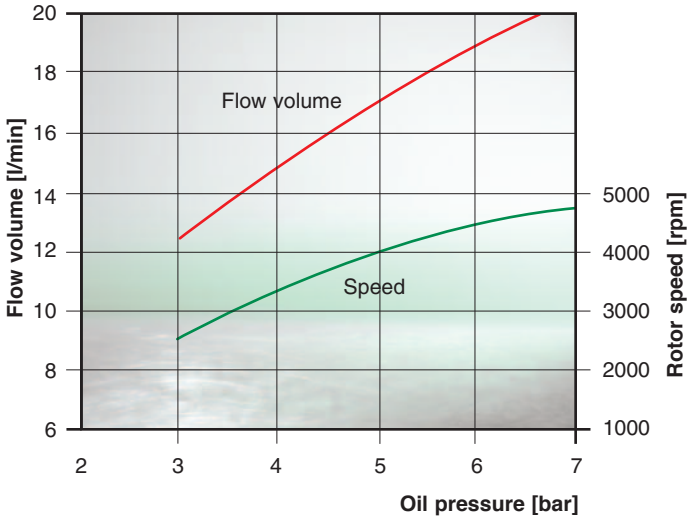




Part no.	Type	Oil inlet connection thread	Switching pressure shut-off valve [bar]	Mounting thread
68 991 19 701	FM 200-21	1/2" BSP	2.5	M 12
68 991 19 801	FM 200-22	7/8" UNF	2.1	1/2" UNC
68 991 19 901	FM 200-25	M 22x1.5	2.5	M 12
68 991 20 001	FM 200-28	M 22x1.5	2.1	M 12

Characteristics

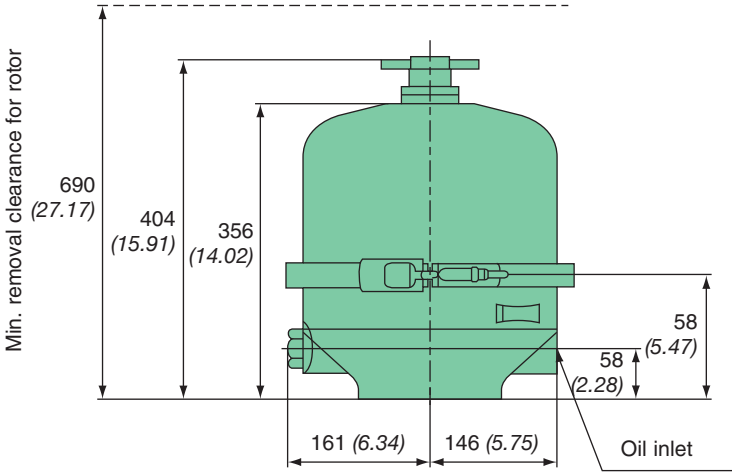
Typical rotor output for SAE 30 oil at 100 °C

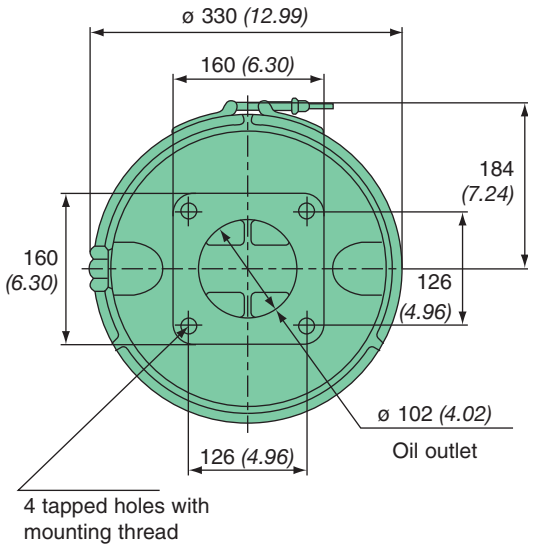


FM 400 Centrifuge

- Suitable for engine oil volumes between 200 and 1500 litres
- Dirt holding capacity of the rotor: 4 litres
- Oil capacity of the rotor: 4.5 litres
- Internal diameter of the oil feed pipe: min. 19 mm
- Internal diameter of the oil return pipe: min. 76 mm
- This model is exclusively available with a cleanable rotor. The rotor is equipped with a paper insert (part no. 68 933 22 601) for simpler maintenance.

- Oil inlet thread and shut-off valve can be adapted to meet customer specifications
- A mounting plate is available for this centrifuge for external fitting away from the engine with compressed-air driven oil return (part no. 68 999 11 108).
- A release tool is available for removing the rotor (part no. 68 906 91 301).
- Empty weight: approx. 22 kg

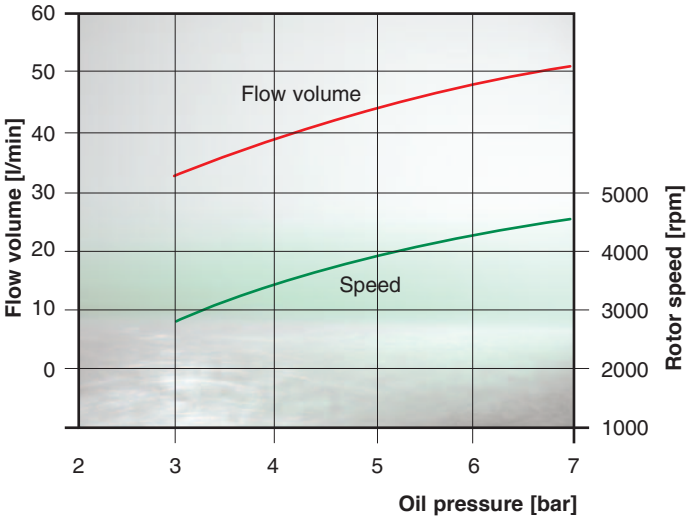




Part no.	Type	Oil inlet connection thread	Switching pressure shut-off valve [bar]	Mounting thread
68 991 34 401	FM 400-21	3/4" BSP	–	M 12
68 991 38 801	FM 400-23	3/4" BSP	2.5	M 12
68 991 36 801	FM 400-24	5/16" UNF	2.5	1/2" UNC
68 991 34 701	FM 400-26	M 27x1.5	2.5	M 12

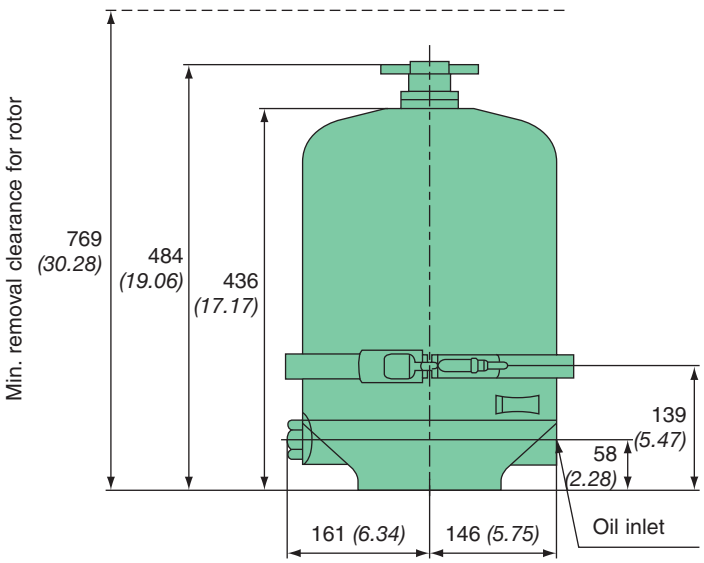
Characteristics

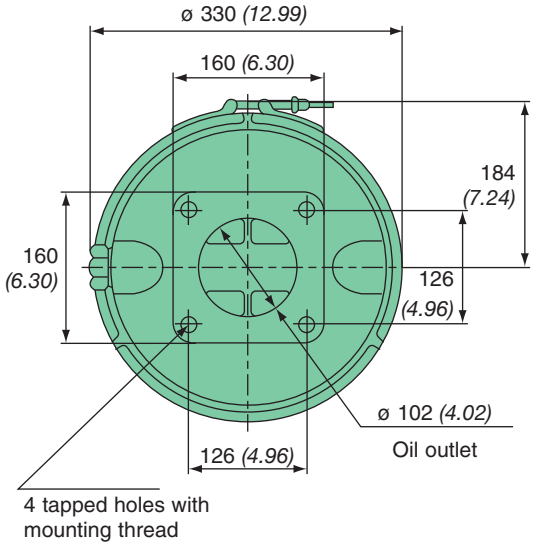
Typical rotor output for SAE 30 oil at 75 °C



FM 600 Centrifuge

- Suitable for engine oil volumes between 200 and 1500 litres
- Dirt holding capacity of the rotor: 6 litres
- Oil capacity of the rotor: 6.5 litres
- Internal diameter of the oil feed pipe: min. 19 mm
- Internal diameter of the oil return pipe: min. 76 mm
- This model is exclusively available with a cleanable rotor. The rotor is equipped with a paper insert (part no. 68 900 00 815) for simpler maintenance.
- Oil inlet thread and shut-off valve can be adapted to customer specifications
- A mounting plate is available for this centrifuge for external fitting away from the engine with compressed-air driven oil return (part no. 68 999 11 101).
- A release tool is available for removing the rotor (part no. 68 906 91 301).
- Empty weight: approx. 25 kg

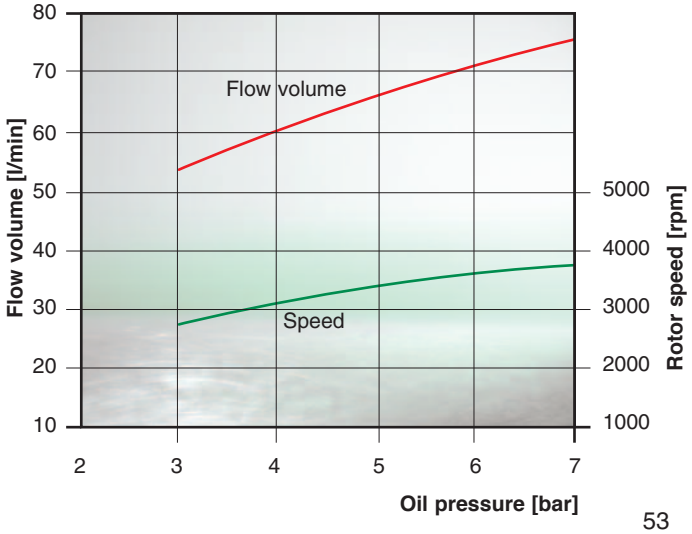




Part no.	Type	Oil inlet connection thread	Switching pressure shut-off valve [bar]	Mounting thread
68 991 18 701	FM 600-21	3/4" BSP	–	M 12
68 991 18 801	FM 600-22	3/4" BSP	3.5	M 12
68 991 18 901	FM 600-23	3/4" BSP	2.5	M 12
68 991 19 001	FM 600-24	15/16" UNF	2.5	1/2" UNC
68 991 19 201	FM 600-25	3/4" NPT	2.5	1/2" UNC
68 991 19 301	FM 600-26	M 27x1.5	2.5	M 12

Characteristics

Typical rotor output for SAE 30 oil at 75 °C




MANN+HUMMEL

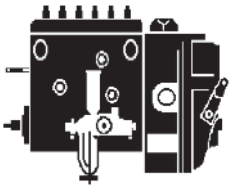
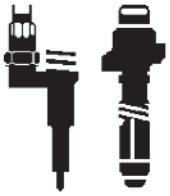
MANN+HUMMEL Fuel filters

Application areas for MANN+HUMMEL fuel filters

The rapid development of diesel technology has made the filtration of diesel fuel before it reaches the injection system a top priority. Badly filtered diesel causes particle erosion, corrosion, and can lead to damage in the injection system.

The contamination of fuel with particles and water occurs during production, transportation, in storage, when the fuel is delivered, and when the tank is filled. This contamination has to be removed in a reliable way. The MANN+HUMMEL product range has the right filter for all types of injection systems.

We recommend the MANN+HUMMEL PreLine (see page 68) as a preliminary fuel filter to pre-separate water and coarse particles.

Application area	Typical required minimum separation efficiency	Filter medium	Page
In-line injection pump 	> 20 %	Standard medium	70
Distributor pump 	> 67 %	Graded medium	71
Unit injector 	> 85 %	Multigrade HC medium	71
Common rail 	> 95 % > 98.6 %	Multigrade HE medium Multigrade HE+ Medium	71

MANN+HUMMEL Multigrade

Fuel filter media

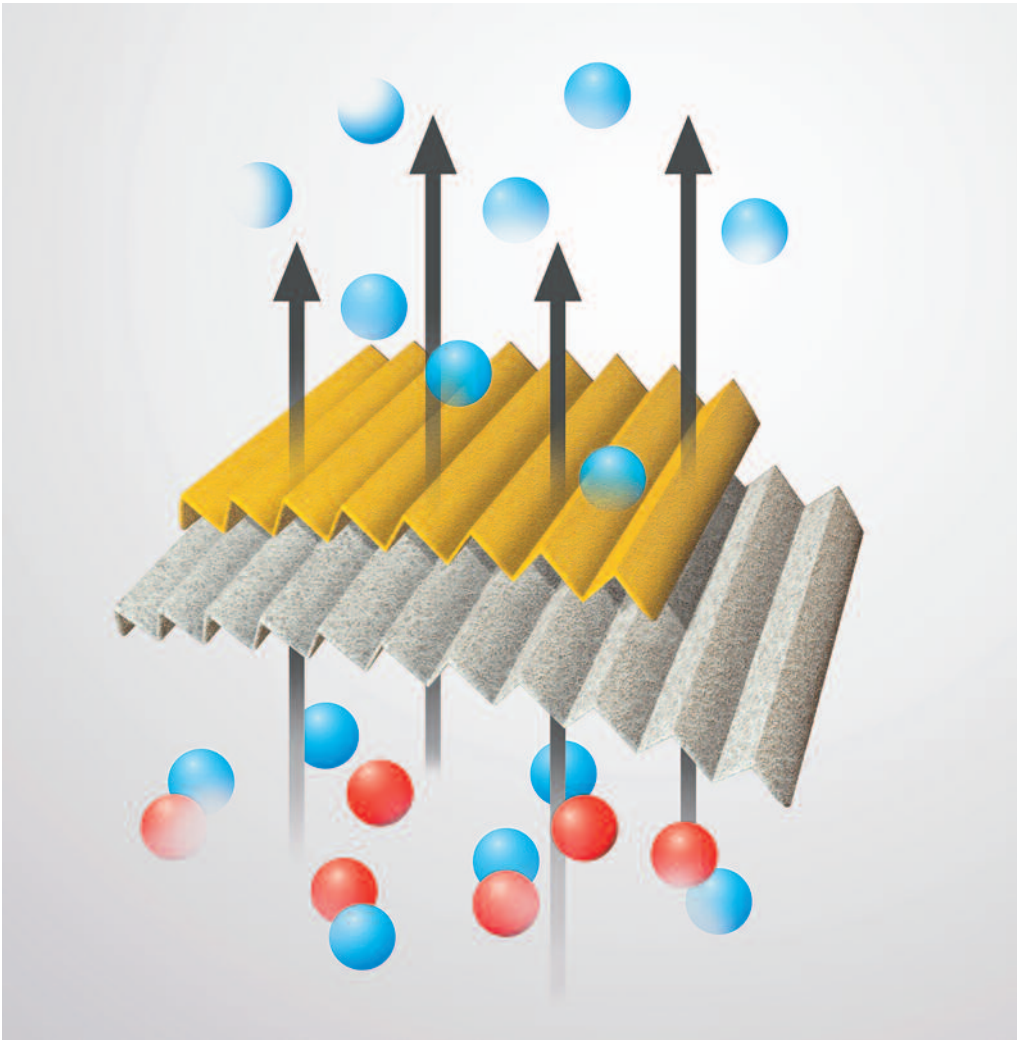
Modern diesel and petrol injection systems require the highest fuel quality and therefore set ever higher standards for the filtration of fuel.
The newly patented MANN+HUMMEL multigrade media were developed for diesel and petrol engines and meet today's highest requirements for fuel filter elements.

Multilayer technology ensures that sensitive injection systems are protected from even the finest particles. In comparison to other media available on the market the multigrade media offers a performance increase in dirt holding capacity of up to 100% with the same high initial separation efficiency.

multigrade
high performance filtration

The family of multigrade media represents an important milestone in the field of fuel filtration. These media are used in all our high performance filters.

On page 61 of this catalogue you will find MANN+HUMMEL spin-on filters with the multigrade media HC (high capacity with water separation), HE (high filter fineness) and HE+ (highest filter fineness). This range economically covers all the requirements of modern fuel filtration. The MANN+HUMMEL multigrade media guarantee the protection necessary for the sensitive injection systems of today.



MANN+HUMMEL multigrade media:
Extended service life and high initial separation efficiency are achieved through an open layer with high dirt holding capacity on the in-flow side and a fine filter layer on the out-flow side.

MANN+HUMMEL Spin-on fuel filters

MANN+HUMMEL spin-on filters are used for the filtration of fuel in a number of applications. MANN+HUMMEL has been a leading manufacturer of spin-on filters worldwide for many years. The filters are distributed under the MANN-FILTER brand and under a variety of customer brands.

The advantages at a glance:

- Available with a range of filter media
- Efficient separation and high dirt holding capacity with low pressure drop
- Robust, anti-corrosion housing with high pulsation and pressure stability
- Geometry designed for optimum flow
- Undetachable seals
- Stable, non-collapsible central tube
- Non-return valve with low pressure drop

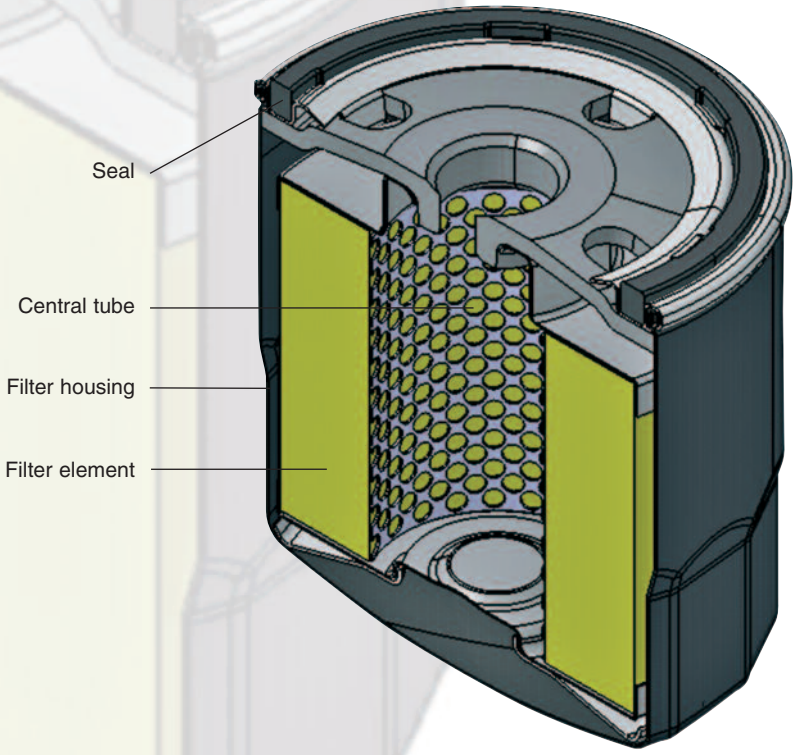
Design

The spin-on filter consists of a robust metal housing with the fitted filter element. Depending on the application, the spin-on filter can be equipped with various components such as a different filter medium, non-return valve or bypass valve, etc.. The liquid to be filtered enters the cover plate through the concentric inlet openings, flows through the filter element and the cleaned liquid then leaves through the central connection. The filter cover plate has an undetachable seal which ensures secure sealing to the outside under all operating conditions.

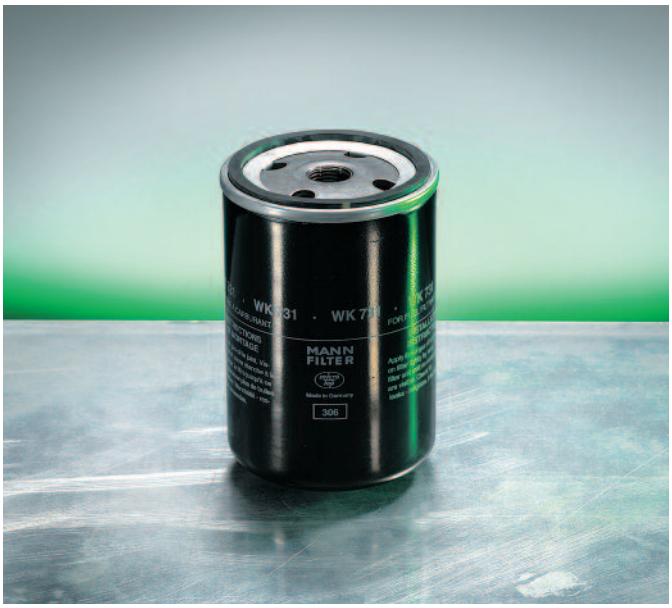
Maintenance

The time for maintenance is usually defined by the engine or machine manufacturer. Maintenance simply requires replacement of the complete spin-on filter. The spin-on filter can easily be removed using a MANN+HUMMEL filter wrench (see page 88).

Cross-section picture



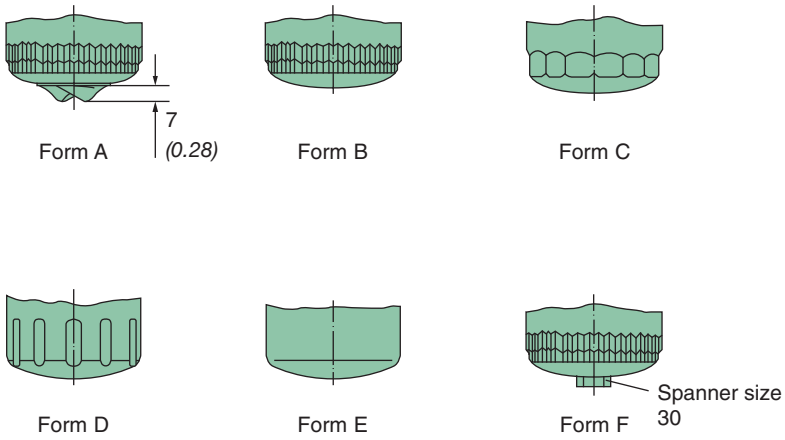
MANN+HUMMEL Spin-on fuel filters



MANN+HUMMEL fuel filters filter out the finest particles from the fuel and thus effectively protect the injection system against wear and dirt particles. They are available with or without a water trap and drain.

Types of spin-on filters

Reference is made to the following types in the dimension table.



WK type, WDK type

In-line fuel injection pumps

These filters are a particularly economic solution for the typical requirements of in-line injection pumps.

We recommend use of our PreLine preliminary fuel filter (see page 68) for water separation in addition to the main filter.

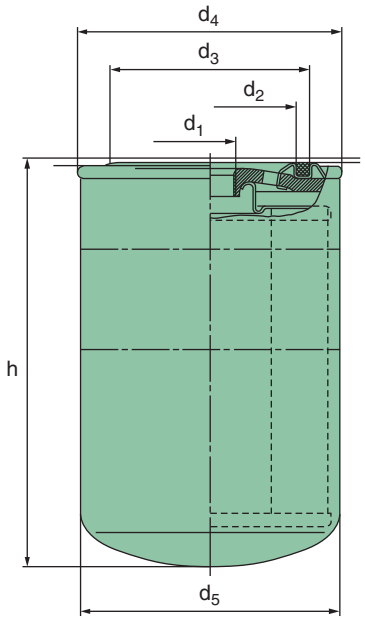


Fig. 1

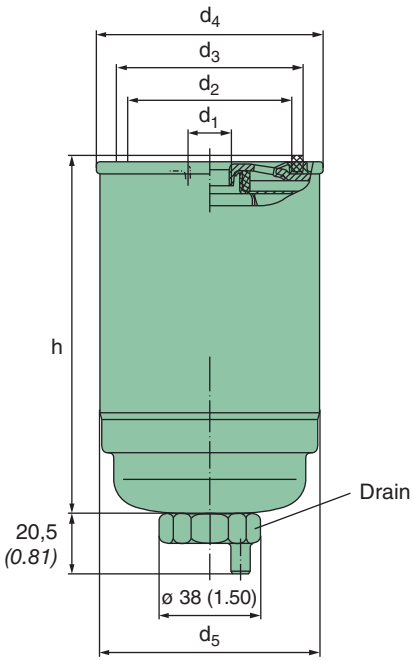


Fig. 2

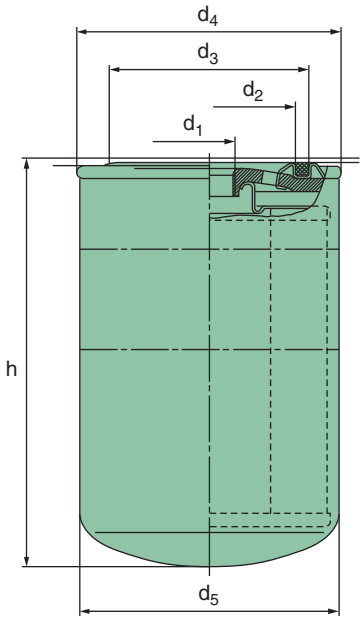
MANN-FILTER	Fig.	Nominal flow rate [l/h] *[gph]*	Dimensions in mm *(Dimensions in inches)*						Separation efficiency *	Permissible operating pressure [bar]	Type (see page 59)
			d_1	d_2	d_3	d_4	d_5	h			
WK 712/2	1	150 *(39.63)*	M 16x1.5	62 *(2.44)*	71 *(2.80)*	80 *(3.15)*	76 *(2.99)*	80 *(3.15)*	> 20%	6	E
WK 723	1	180 *(47.56)*	M 16x1.5	62 *(2.44)*	71 *(2.80)*	80 *(3.15)*	76 *(2.99)*	124 *(4.88)*	> 20%	9.5	E
WK 731	1	180 *(47.56)*	M 16x1.5	62 *(2.44)*	71 *(2.80)*	80 *(3.15)*	76 *(2.99)*	117 *(4.61)*	> 20%	6	E
WK 731/1	1	180 *(47.56)*	M 14x1.5	30 *(1.18)*	38 *(1.50)*	80 *(3.15)*	76 *(2.99)*	115 *(4.53)*	> 20%	2.5	E
WK 842 [1]	2	200 *(52.84)*	M 16x1.5	61 *(2.40)*	70 *(2.76)*	84 *(3.31)*	81 *(3.19)*	134.5 *(5.30)*	> 20%	6	–
WK 842/6 [1]	2	300 *(79.26)*	M 16x1.5	61 *(2.40)*	70 *(2.76)*	84 *(3.31)*	81 *(3.19)*	134.5 *(5.30)*	Strainer 63 µm	6	–
WK 950/3	1	350 *(92)*	1“-14 NS	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	170 *(6.69)*	> 20%	2.5	B
WK 962/4	1	480 *(126.82)*	M 16x1.5	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	210 *(8.27)*	> 20%	2.5	B
WDK 962/10	1	600 *(158.52)*	M 16x1.5	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	212 *(8.35)*	> 45%	15	E

* All figures relate to a particle size of 3-5 µm (c) and are given acc. to ISO/TR 13 353 (1994).

1) with drain

WK type, WDK type

Fuel distributor pumps / unit injectors / common rail



These fuel filters from MANN+HUMMEL use our high performance graded and patented multigrade media. The multigrade media are especially characterised by a simultaneous high dirt holding capacity and excellent separation performance.

For common rail, unit injectors and distributor pumps we recommend the use of our PreLine preliminary fuel filter (see page 68) for the separation of water.

MANN-FILTER	Nominal flow rate [l/h] *[gph]*	Dimensions in mm *(Dimensions in inches)*						Separation efficiency *	Permissible operating pressure [bar]	Medium	Type (see page 59)
		d_1	d_2	d_3	d_4	d_5	h				
WDK 719	170 *(44.91)*	M 16x1.5	62 *(2.44)*	71 *(2.80)*	80 *(3.15)*	76 *(2.99)*	127 *(5.00)*	> 85%	7	Multigrade HC	E
WDK 725 [1]	120 *(31.70)*	M 16x1.5	62 *(2.44)*	71 *(2.80)*	80 *(3.15)*	76 *(2.99)*	146 *(5.75)*	> 67%	6	Graded medium	E
WDK 925	250 *(66.05)*	M 22x1.5	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	144 *(5.67)*	> 85%	15	Multigrade HC	E
WK 940/2	250 *(66.05)*	M 24x1.5	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	144 *(5.67)*	> 85%	6	Multigrade HC	E
WK 962/7	650 *(171.73)*	M 18x1.5	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	212 *(8.35)*	> 85%	7	Multigrade HC	E
WDK 962/15	590 *(155.88)*	M 16x1.5	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	212 *(8.35)*	> 67%	10	Graded medium	E
WDK 962/16	530 *(140.03)*	M 16x1.5	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	212 *(8.35)*	> 85%	15	Multigrade HC	E
WDK 962/14	530 *(140.03)*	M 16x1.5	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	212 *(8.35)*	> 95%	10	Multigrade HE	E
WDK 962/12	580 *(153.24)*	M 16x1.5	62 *(2.44)*	71 *(2.80)*	96 *(3.78)*	93 *(3.66)*	212 *(8.35)*	> 98.6%	15	Multigrade HE+	E
WDK 11 102/7	1000 *(264.20)*	M 32x1.5	93 *(3.66)*	104 *(4.09)*	113 *(4.45)*	108 *(4.25)*	262 *(10.31)*	> 67%	7	Graded medium	E
WDK 11 102/1	860 *(227.21)*	M 32x1.5	93 *(3.66)*	104 *(4.09)*	113 *(4.45)*	108 *(4.25)*	262 *(10.31)*	> 85%	7	Multigrade HC	E
WDK 11 102/6	860 *(227.21)*	M 32x1.5	93 *(3.66)*	104 *(4.09)*	113 *(4.45)*	108 *(4.25)*	262 *(10.31)*	> 95%	7	Multigrade HE	E
WDK 11 102/3	860 *(227.21)*	M 32x1.5	93 *(3.66)*	104 *(4.09)*	113 *(4.45)*	108 *(4.25)*	262 *(10.31)*	> 98.6%	7	Multigrade HE+	E

* All figures relate to a particle size of 3-5 µm (c) and are given acc. to ISO/TR 13 353 (1994).

1) with drain


MANN+HUMMEL

MANN+HUMMEL In-line fuel filters

MANN+HUMMEL In-line fuel filters

The range of MANN+HUMMEL in-line fuel filters starts with the PreLine preliminary filter for the separation of water and includes the main fuel filter with single or duplex versions, right up to duplex filters with changeover. The filtration characteristics are mainly defined by the spin-on filter used or the filter media.

The advantages at a glance:

- Easy fitting in existing lines
- Robust, stable cast aluminium design
- More flexibility can be added to the standard version by the addition of an optional optical or electrical service switch (see pages 89+90)
- Duplex types with changeover are available and are particularly suitable for marine applications
- Low pressure drop
- Proven quality of the MANN+HUMMEL spin-on filter

Design

The filter consists of the filter head with connection threads and mounting possibilities and the MANN+HUMMEL spin-on filter.

The MANN+HUMMEL service indicator or service switch and bypass valve have to be selected so as to ensure that necessary filter maintenance is signalled before the bypass valve opens. Please contact your MANN+HUMMEL contact partner for further information.

Available versions:

- with service indicator

- with service switch (make/break contact convertible)

Fitting and maintenance

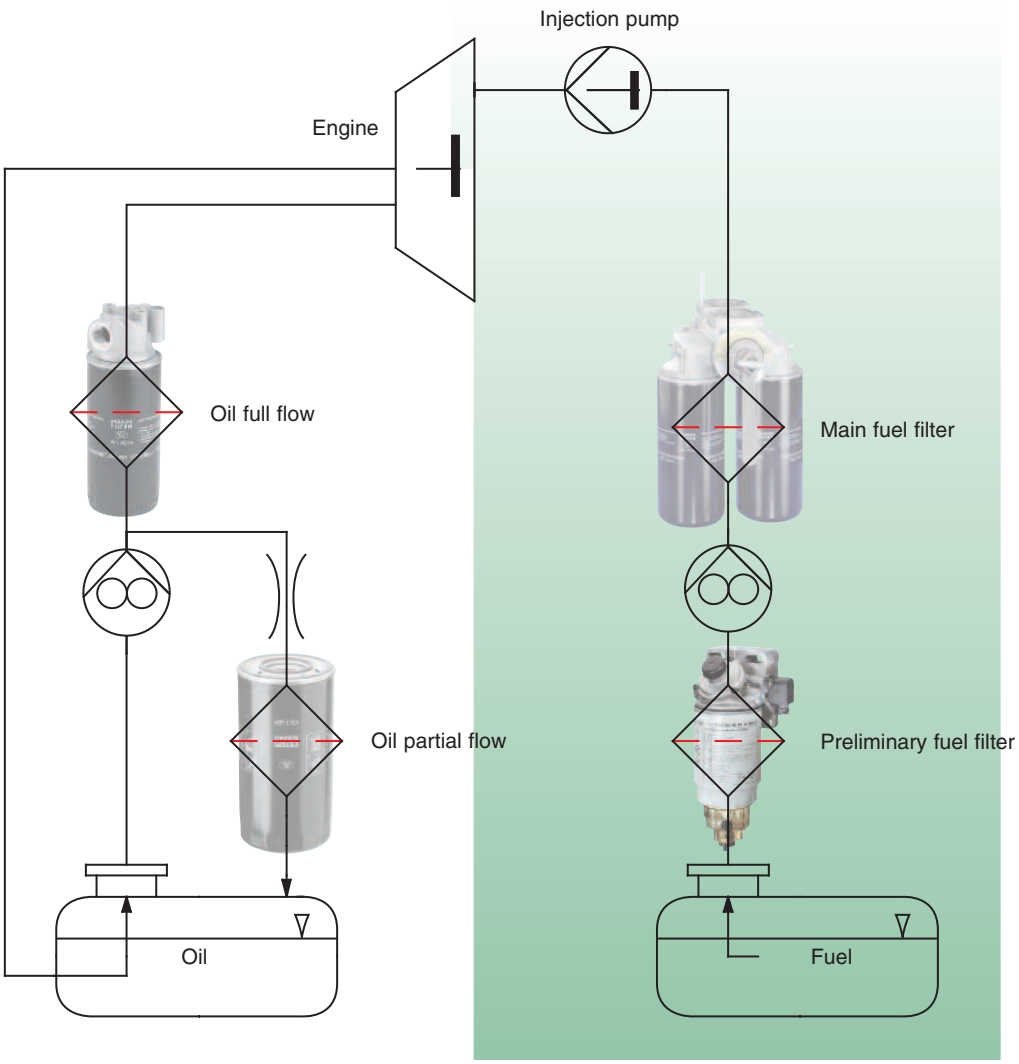
The filter is fitted in the pipeline, whereby the flow direction has to be observed. This is indicated by arrows on the connection threads.

The time for maintenance is usually defined by the engine or equipment manufacturer. Maintenance simply requires replacement of the complete spin-on filter.

The spin-on filter can be easily removed using the respective MANN+HUMMEL filter wrench (see page 88).

The in-line filter allows various combinations between the spin-on filter and the filter head. This catalogue only lists the basic types. If you do not find an in-line filter suitable for your application, please get in touch with your MANN+HUMMEL contact partners. They will be happy to advise you on the appropriate in-line filter consisting of a filter head, spin-on filter and accessories.

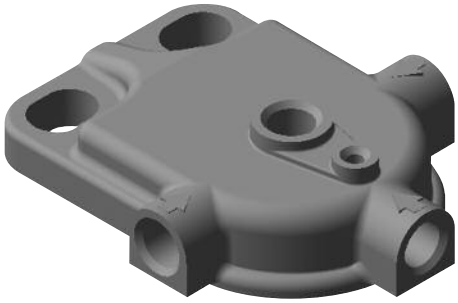
Diagram of filter arrangement around the engine



Overview of fuel filter heads

Single head, screwed on, with optional manual pump and heater **Page 69**

This head is designed especially for our PreLine preliminary fuel filter series. It is optionally available with a manual pump and heater.



Single head **Page 70**

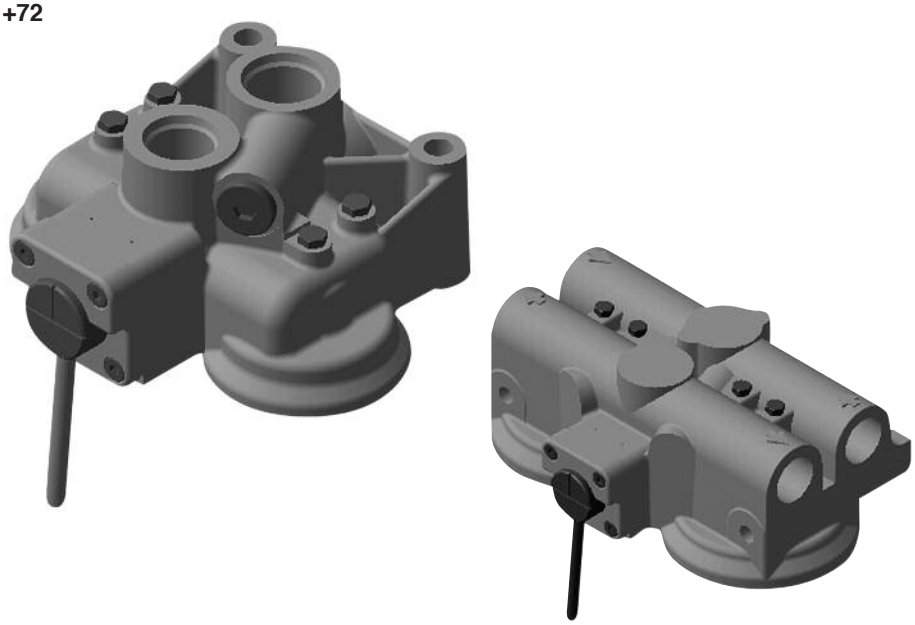
The universal head for fuel filtration to reduce weight and save space. In the horizontal plane there are three usable inlet openings and one outlet in the vertical plane. The head is equipped with a vent screw.

Overview of fuel filter heads

Duplex with changeover

Page 71+72

Both heads are manufactured in cast aluminium. They allow a change of filter during operation. Using a changeover lever it is possible to direct the flow through a single filter or through both filters in parallel. If necessary a MANN+HUMMEL service switch or service indicator can be fitted (see pages 89+90). Both heads are equipped with venting.



Duplex with changeover in spheroidal graphite cast iron (EN-GJS-400-15)

Page 73

This duplex filter is classified according to prevailing regulations in the marine field such as SOLAS * and GL ** and is predestined for use in marine applications on ships. High quality PTFE sealing elements are used on the changeover handle. A change of filter during operation is possible by changing to only one filter.

* SOLAS = Safety of Life at Sea

** GL = German Lloyd

In-line fuel filters

PreLine preliminary filter for the separation of water

Increasing pressures in injection systems have in turn considerably increased the requirements for fuel filtration with regard to the separation of water and particles. The injection pump manufacturers have therefore drawn up a list of requirements. MANN+HUMMEL filters more than completely fulfil the requirements.

Our PreLine preliminary fuel filter series reliably meets the required water separation efficiency of at least 93 % acc. to ISO 4020 thanks to the specially developed melt-blown medium.

The standard version has a manual pump and manual drain. Other versions are available with an electrical diesel heater and water sensor.

PreLine 270

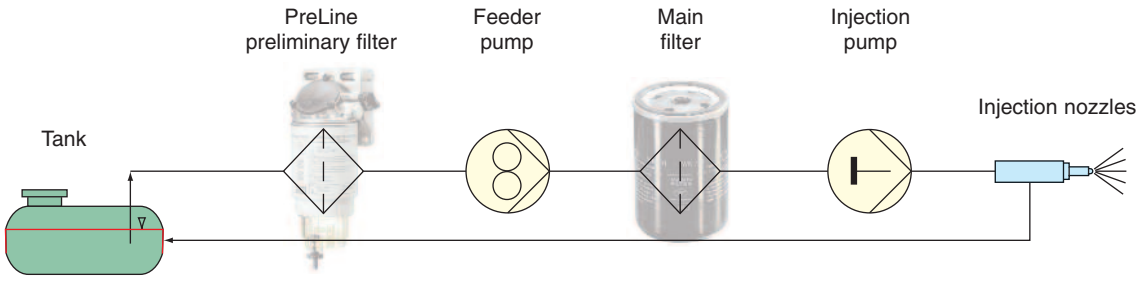
PreLine 420 with heater and water sensor

Water trap and fitting tool

The advantages at a glance:

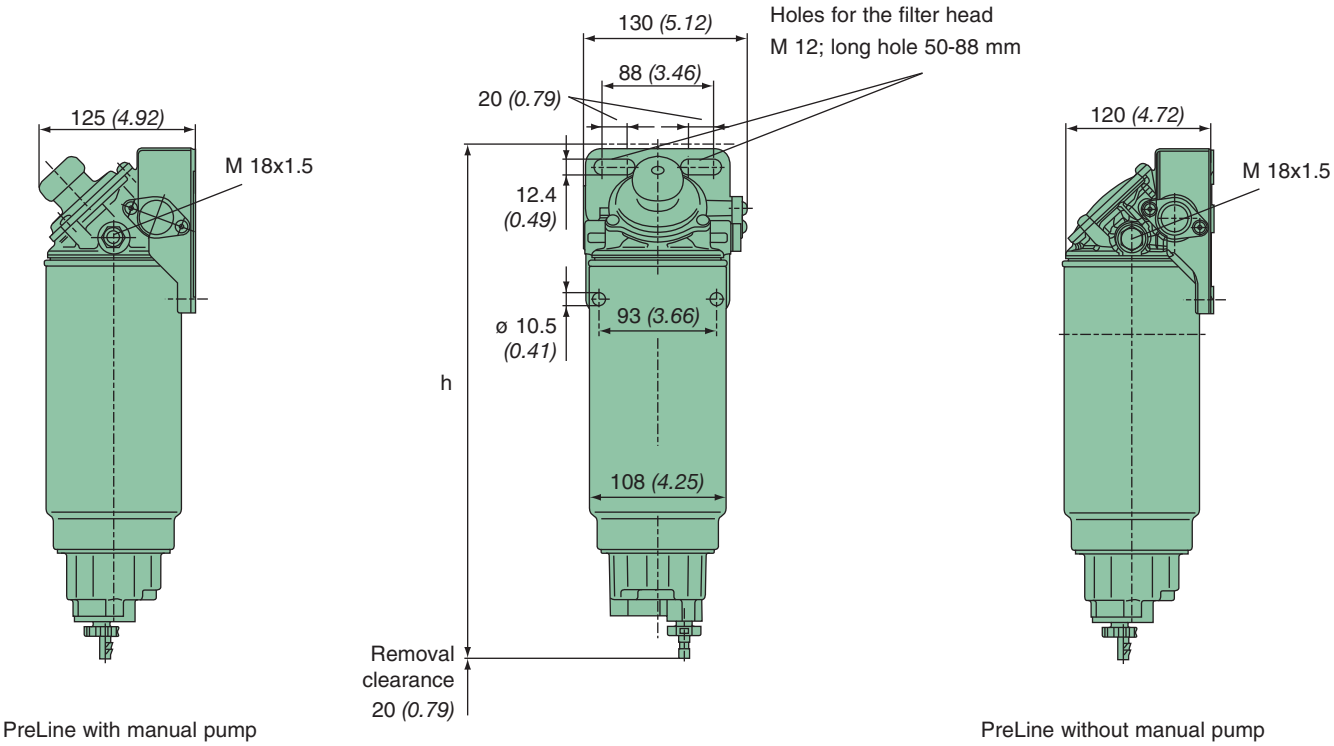
- Excellent water separation
- Design with highly integrated function
- High dynamic stiffness
- Optional: electrical heater in the inflow
- Increases the filter service life of the main filter
- Ideal as retrofit solution
- Protects modern injection systems against damage caused by corrosion and abrasion
- Reduces costs through longer engine life
- Reduces repair costs

Typical arrangement of the fuel filter around the engine



In-line fuel filters

PreLine preliminary filter for the separation of water



PreLine with manual pump

PreLine without manual pump

The following is valid for all PreLine variations:
Water separation: > 93 %
Operating pressure: 4 bar
Separation efficiency acc. to ISO/TR 13 353 for 3-5 µm particles:
Multigrade medium PF: > 45%
Multigrade medium PFO: > 10%

Accessories:
Heater for fitting in the filter head: part no. 29 017 00 202 (24 V, 350 W; temperature switching point 5 °C, switches automatically on and off)
Water trap: part no. 66 606 12 982
Fitting tool: part no. LS 7/4

Part no.	Type	Nominal flow rate [l/h] *[gph]*	Dimensions in mm *(Dimensions in inches)* h	MANN-FILTER		Filter head	Water trap
				Multigrade medium PF	Multigrade medium PFO		
66 606 62 251	PreLine 420	420 *(110.96)*	406 *(15.98)*	**PL 420/1**	–	with pump	with sensor
66 606 62 255				**PL 420/1**	–	with pump	without sensor
66 606 62 257				**PL 420/1**	–	without pump	with sensor
66 606 62 253				**PL 420/1**	–	without pump	without sensor
66 606 62 261				–	**PL 420**	with pump	with sensor
66 606 62 265				–	**PL 420**	with pump	without sensor
66 606 62 267				–	**PL 420**	without pump	with sensor
66 606 62 263				–	**PL 420**	without pump	without sensor

Part no.	Type	Nominal flow rate [l/h] *[gph]*	Dimensions in mm *(Dimensions in inches)* h	MANN-FILTER		Filter head	Water trap
				Multigrade medium PF	Multigrade medium PFO		
66 604 62 251	PreLine 270	270 *(71.33)*	326 *(12.83)*	**PL 270/1**	–	with pump	with sensor
66 604 62 255				**PL 270/1**	–	with pump	without sensor
66 604 62 257				**PL 270/1**	–	without pump	with sensor
66 604 62 253				**PL 270/1**	–	without pump	without sensor
66 604 62 261				–	**PL 270**	with pump	with sensor
66 604 62 265				–	**PL 270**	with pump	without sensor
66 604 62 267				–	**PL 270**	without pump	with sensor
66 604 62 263				–	**PL 270**	without pump	without sensor

In-line fuel filters

Main filter with single head

The following shows a selection of MANN+HUMMEL in-line filters equipped with our proven fuel filters. Many other combinations are also available.
Please contact your MANN+HUMMEL contact partner for more information.

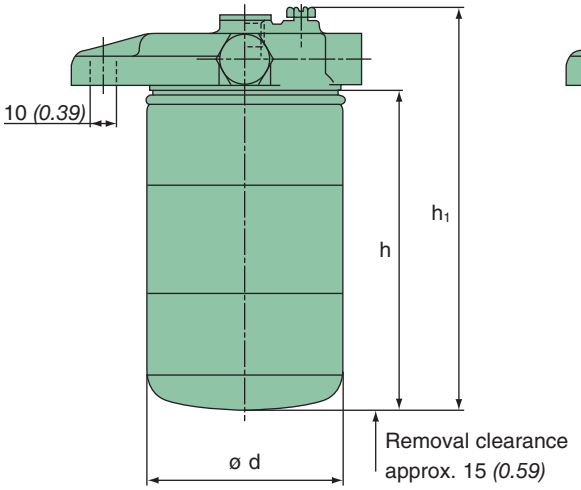


Fig. 1

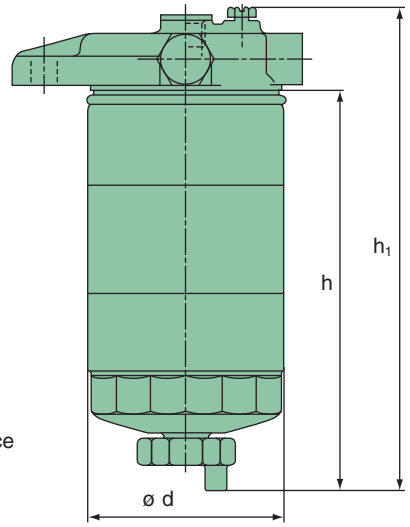
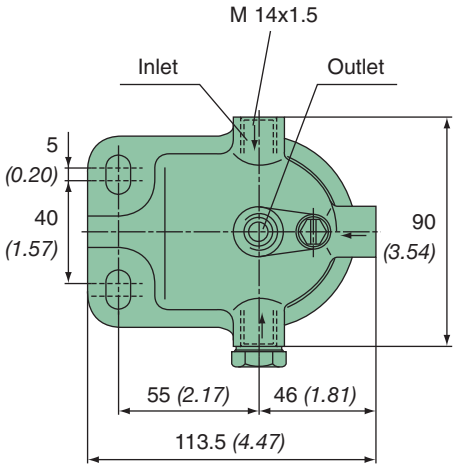


Fig. 2



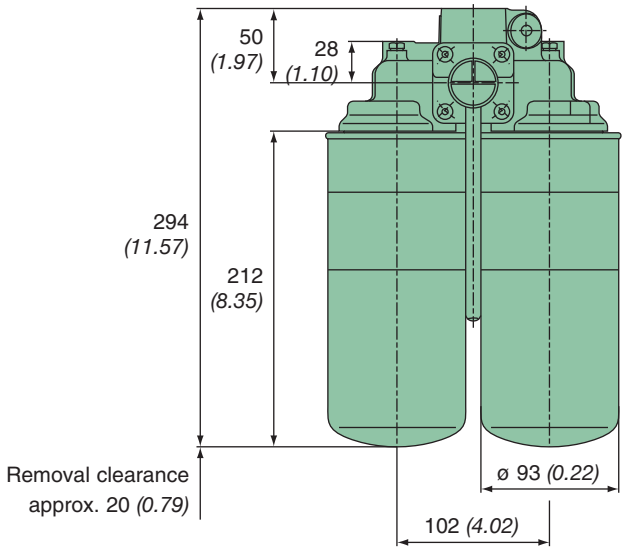
Part no.	Fig.	MANN-FILTER (see page 60)	Nominal flow rate [l/h] *[gph]*	max. operating pressure [bar]	Dimensions in mm *(Dimensions in inches)* h	h_1	d	Drain
66 403 62 182	1	**WK 723**	180 *(47.56)*	2.5	126 *(4.96)*	153 *(6.02)*	76 *(2.99)*	no
66 404 62 242	1	**WK 731**	180 *(47.56)*	2.5	119 *(4.69)*	144 *(5.67)*	76 *(2.99)*	no
66 405 62 112	2	**WK 842**	200 *(52.84)*	2.5	155 *(6.10)*	182 *(7.17)*	80 *(3.15)*	yes
66 400 62 252	2	**WK 842/6**	300 *(79.26)*	2.5	155 *(6.10)*	182 *(7.17)*	81 *(3.19)*	yes

In-line fuel filters

In-line duplex main filter with changeover

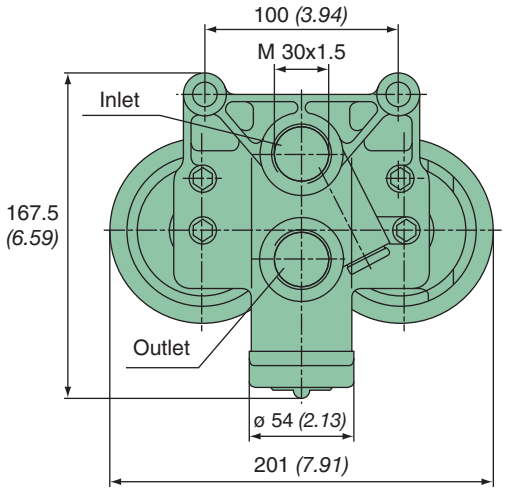
The combination of the unbeatable in-line filter with a duplex function allows either parallel operation of both the spin on filters or operation with respectively one of the spin-on filters. When the flow is restricted to one of the filters, it is possible to change the other filter without stopping the engine.

These filter heads are equipped with MANN+HUMMEL spin-on filters containing graded and multigrade media.



Three-way handle positions

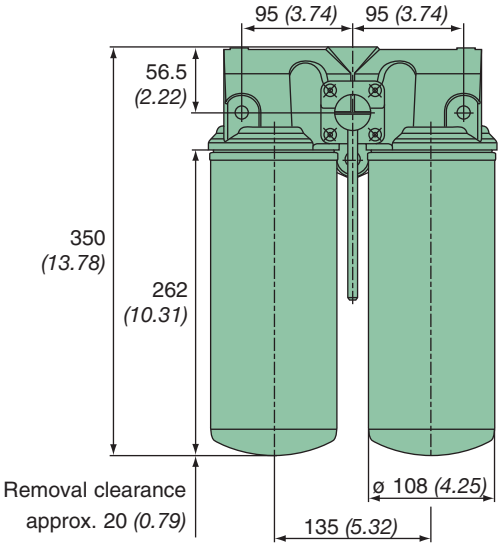
filter in operation

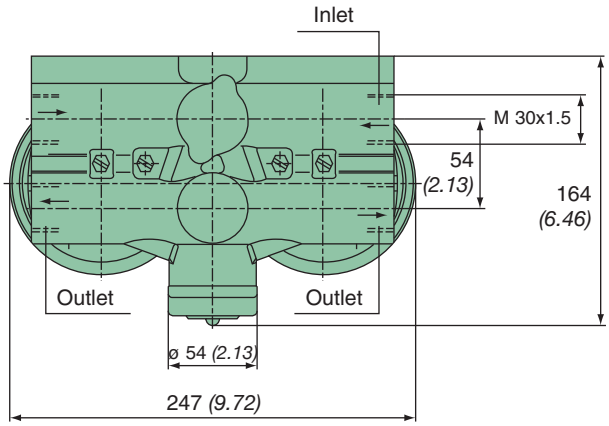


Part no.	MANN-FILTER (see page 61)	Nominal flow rate [l/h] *[gph]*	max. operating pressure [bar]	Medium
66 511 82 110	**WDK 962/16**	530 *(140.03)*	15	Multigrade HC
66 511 82 120	**WDK 962/14**	530 *(140.03)*	10	Multigrade HE
66 511 82 130	**WDK 962/12**	580 *(153.24)*	10	Multigrade HE+

In-line fuel filters

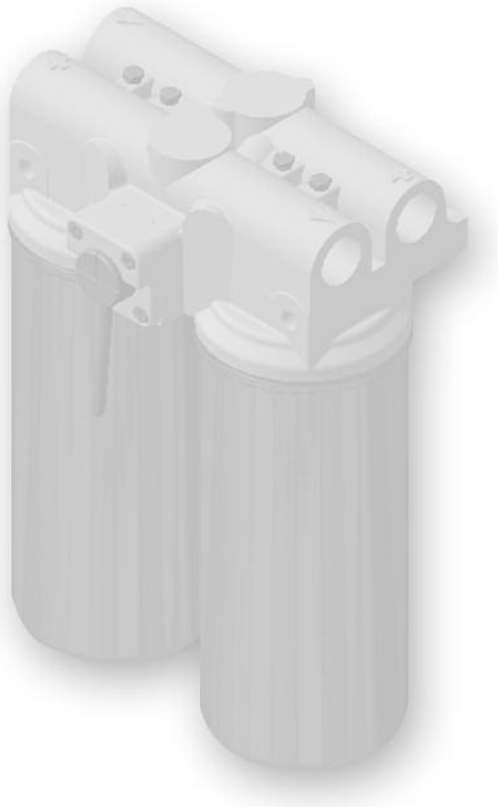
Duplex main filter with changeover, horizontal inlet and outlet





Three-way handle positions

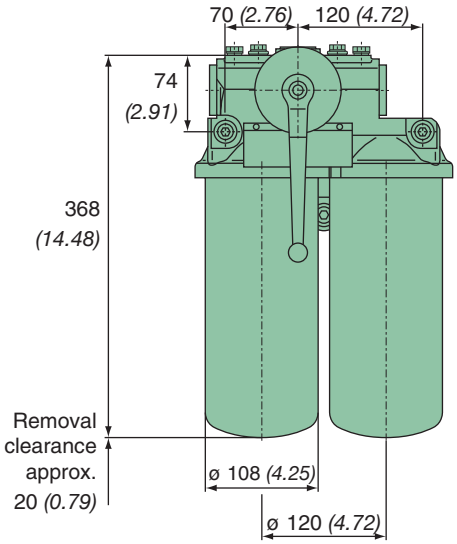
filter in operation

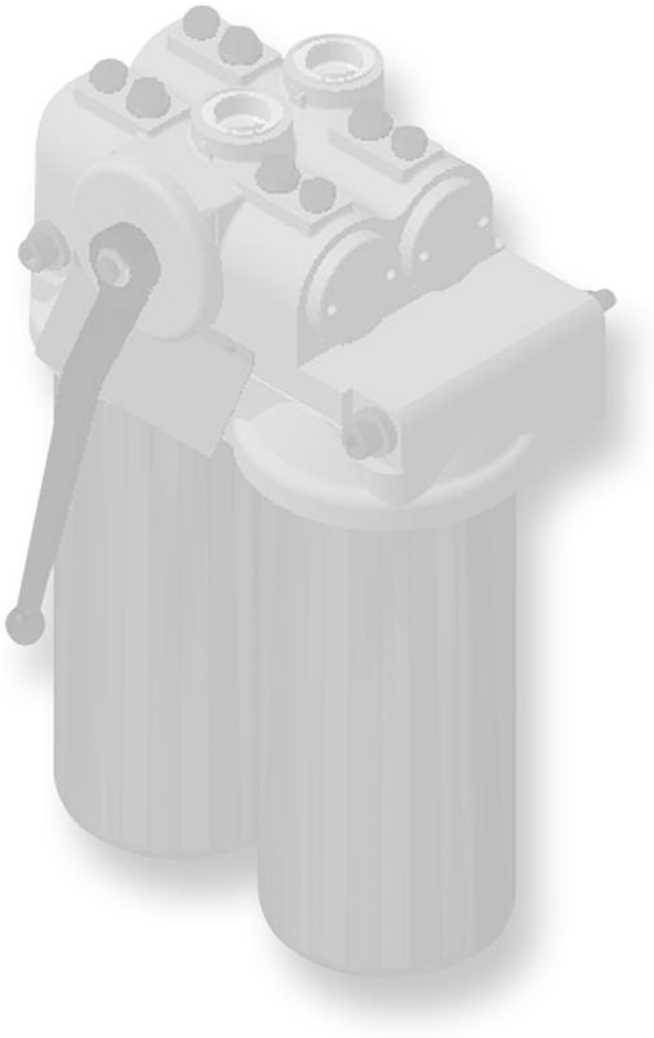


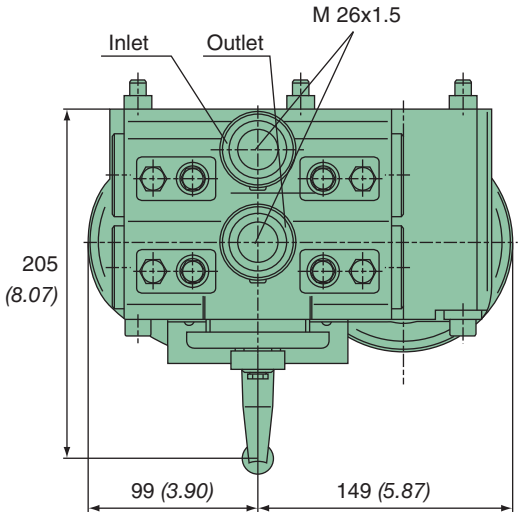
Part no.	MANN-FILTER (see page 61)	Nominal flow rate [l/h] *[gph]*	max. operating pressure [bar]	Medium
66 619 82 100	**WDK 11 102/7**	1000 *(246.20)*	7	Graded medium
66 619 82 110	**WDK 11 102/1**	860 *(227.21)*	7	Multigrade HC
66 619 82 120	**WDK 11 102/6**	860 *(227.21)*	7	Multigrade HE
66 619 82 130	**WDK 11 102/3**	860 *(227.21)*	7	Multigrade HE+

In-line fuel filters

Duplex main filter with changeover, inlet and outlet from above







Part no.	MANN-FILTER (see page 61)	Nominal flow rate [l/h] *[gph]*	max. operating pressure [bar]	Medium
66 612 82 121	**WDK 11 102/7**	1000 *(246.20)*	7	Graded medium
66 612 82 131	**WDK 11 102/1**	860 *(227.21)*	7	Multigrade HC
66 612 82 141	**WDK 11 102/6**	860 *(227.21)*	7	Multigrade HE
66 612 82 151	**WDK 11 102/3**	860 *(227.21)*	7	Multigrade HE+

In-line fuel filters

Main filter – Fitting in flexible hose lines

For less demanding filtration requirements our especially economic small filter in synthetic material is available for fitting in flexible hose lines. These filters are characterised by relatively high flow rates for their small size.

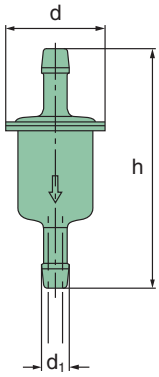


Fig. 1

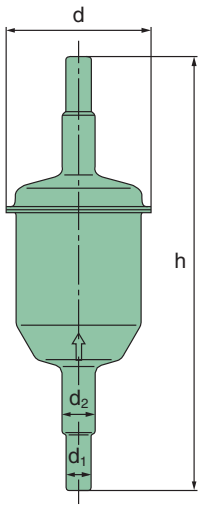


Fig. 2

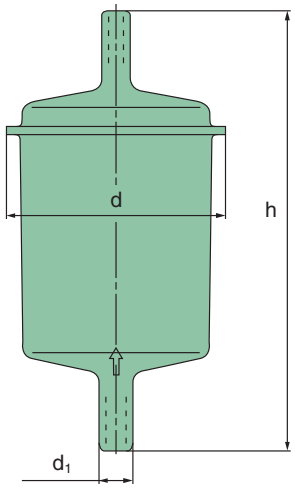


Fig. 3

MANN-FILTER	Fig.	Dimensions in mm *(Dimensions in inches)*				Mesh size
		d	d_1	d_2	h	[µm]
WK 21	1	21 *(0.83)*	6 *(0.24)*	–	50 *(1.97)*	50
WK 21/2	1	21 *(0.83)*	6 *(0.24)*	–	50 *(1.97)*	136
WK 31/2	2	35 *(1.38)*	6 *(0.24)*	8 *(0.32)*	104 *(4.09)*	Filter paper element
WK 31/4	2	37 *(1.46)*	8 *(0.32)*	–	104 *(4.09)*	200
WK 31/5 [1)]	2	37 *(1.46)*	8 [1)] *(0.32)*	–	105 *(4.13)*	200
WK 32	2	37 *(1.46)*	6 *(0.24)*	8 *(0.32)*	142 *(5.59)*	Filter paper element
WK 43/1	3	59 *(2.32)*	8 *(0.32)*	–	108 *(4.25)*	Filter paper element

1) Right-angled outlet connection
Further types available on request.

MANN+HUMMEL Fuel filter elements

MANN+HUMMEL Fuel filter elements

MANN+HUMMEL filter elements for fuel are equipped with a star-pleated bellows and feature an ideal surface for the retention of dirt particles with a correspondingly longer service life.

The advantages at a glance:

- Consistently high separation efficiency
- Filter element with high dirt holding capacity thanks to maximised filter surface area
- Special pleat impregnation allows the large filter surface area to be effective for the whole period of use
- Special impregnation resistant to water and fuel up to a temperature of 140 °C
- Various versions available acc. to DIN and ISO standards
- Highly economic solution with intense machine use through re-utilisation of filter housing on the machine side.

Design

The filter element consists of the two end caps with the filter medium fitted in the middle. Depending on the type of element, end caps are available in metal or metal-free versions. The end caps are fitted with seals which ensure reliable sealing between the raw and the clean side.

Depending on the application, filter elements are available with element protection through an integrated handle. The flow of liquid through the element takes place from the outside to the inside.

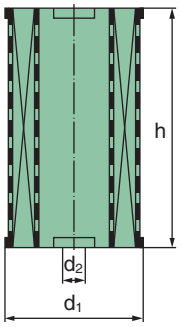
Maintenance

The time when maintenance is required is usually defined by the engine or machine producer. Maintenance simply requires replacement of the used element.

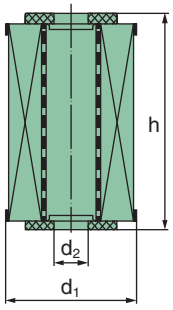
P type

In-line fuel injection pumps

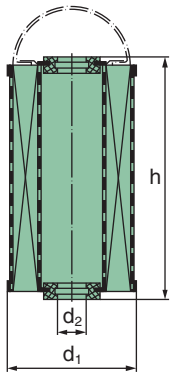
These filter elements are mainly used with in-line injection pumps used in diesel engines. As with the spin-on filters the selection of the recommended separation efficiency is defined by the technology of the injection system (see page 66) and the quality of the fuel.



Form A



Form B



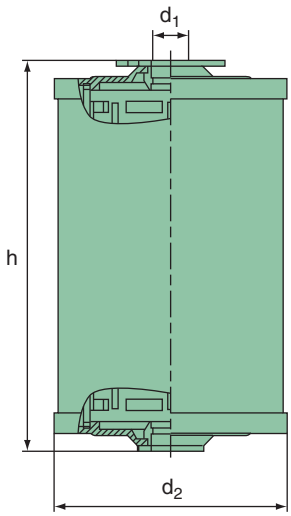
Form D
acc. to DIN 73 358

MANN-FILTER	Nominal flow rate [l/h] *[gph]*	Dimensions in mm *(Dimensions in inches)*			Separation efficiency *	Type
		d_1	d_2	h		
P 46/1	35 *(9.25)*	40 *(1.57)*	8.5 *(0.33)*	133 *(3.24)*	> 20%	B
P 78	40 *(10.57)*	65 *(2.56)*	14 *(0.55)*	53 *(2.09)*	> 45%	A
P 609 [4]	30 *(7.93)*	51 *(2.01)*	8 [2] *(0.31)*	68 *(2.68)*	> 20%	B
P 707 [4]	90 [3] *(23.78)*	65 *(2.56)*	14 [1] *(0.55)*	116 *(4.57)*	> 20%	D
P 715 [4]	65 [3] *(17.17)*	65 *(2.56)*	14 [1] *(0.55)*	65 *(2.56)*	> 20%	D
P 725	150 *(39.63)*	65 *(2.56)*	14 *(0.55)*	100.5 *(3.96)*	> 20%	A
P 810	70 *(18.49)*	68 *(2.68)*	21 *(0.83)*	84 *(3.31)*	> 20%	A
P 811 [4]	120 [3] *(31.70)*	83 *(3.27)*	14 *(0.55)*	146 *(5.75)*	> 20%	D
P 824	80 *(153.24)*	72 *(2.83)*	32 *(1.26)*	89 *(3.50)*	> 20%	A
P 825 [4]	70 *(18.49)*	77 *(3.03)*	26 *(1.02)*	100 *(3.94)*	> 20%	B
P 921/2 [4]	120 *(31.70)*	83 *(3.27)*	26 *(1.02)*	118 *(4.65)*	> 20%	B
P 934 [5]	150 *(39.63)*	83 *(3.27)*	10 [2] *(0.39)*	167 *(6.57)*	> 20%	B
P 1018/1	450 [3] *(118.89)*	100 *(3.94)*	20 [1] *(0.79)*	171.5 *(6.75)*	> 20%	D

1) External diameter according to DIN 2391.
2) Nominal diameter for bolt.
3) Flow rate with 1 m gradient (when new, acc. to DIN 73 358).
4) With felt gasket.
5) With cork insert.
* All figures relate to a particle size of 3-5 µm (c) acc. to ISO/TR 13 353 (1994).

BFU type

In-line fuel injection pumps / general preliminary filters



These filter elements are free of metal and particularly environmentally friendly. They are mainly used for in-line injection pumps. For stage filters the BFU type is always used as the first preliminary filter in the flow direction.

MANN-FILTER	Nominal flow rate [l/h] *[gph]*	Dimensions in mm *(Dimensions in inches)*			Separation efficiency *
		d_1	d_2	h	
BFU 707	90 *(23.78)*	13 *(0.51)*	59 *(2.32)*	115 *(4.53)*	> 10%
BFU 811	150 *(39.63)*	13 *(0.51)*	85 *(3.35)*	145 *(5.71)*	> 10%
BFU 900	150 *(39.63)*	13 *(0.51)*	85 *(3.35)*	145 *(5.71)*	> 10%

* All figures relate to a particle size of 3-5 µm (c) acc. to ISO/TR 13 353 (1994).

MANN+HUMMEL Gap-type filters

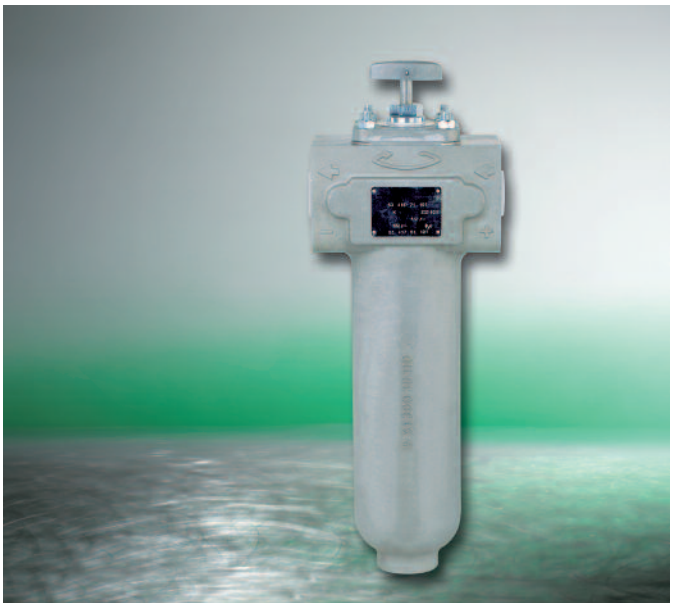
MANN+HUMMEL Gap-type filters

Plate gap-type filters, wire gap-type filters and gap-type tube filters are suitable for the filtration of highly contaminated high and low viscous media such as fuel, lube oils, paints, polyol, isocyanate, cooling lubricants, etc. They are used in nearly all industrial fields, including:

- Steam engines and hydromotors
- Pumps
- Hydraulic systems
- Machine tools
- Gearboxes
- Medium to large-sized combustion engines
- Food industry
- Cleaning of water and liquids for chemical processes, etc.

MANN+HUMMEL gap-type filters can be cleaned during operation, are easy to maintain and are characterised by a very long service life.

Gap-type filters are used in full flows and partial flows. The fluid passes through the filter inserts from the outside to the inside. Various gap widths define the filter fineness. MANN+HUMMEL gap-type filters can also be combined with MANN+HUMMEL in-line filters (highly efficient fine filters) to make multi-stage filters. You can find in-line filters for oil and fuel respectively on pages 15 and 63.



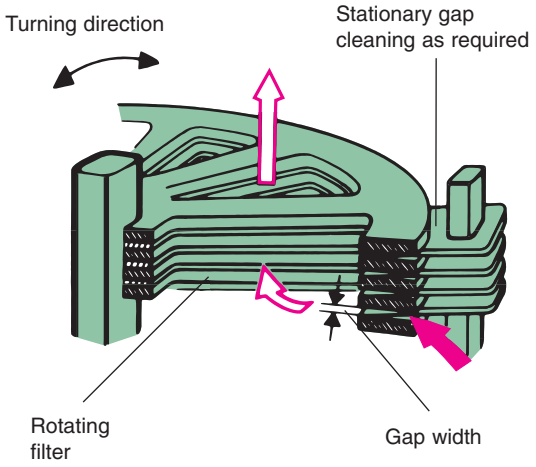
The filter housing is made of carbon steel, grey cast iron, cast aluminium or nickel chromium steel. Special types are available on request.

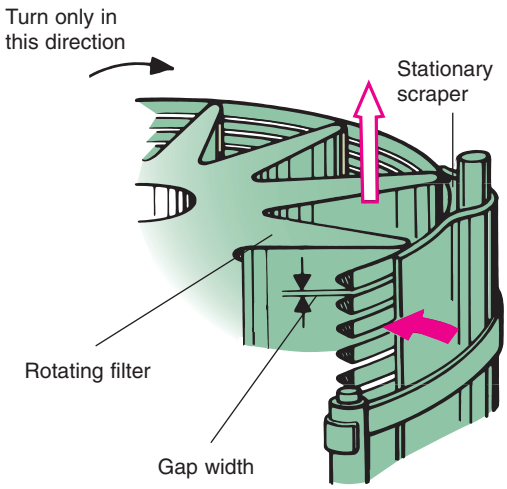
Different gap-type filter designs

Plate gap-type filters for gap widths ≥ 0.1 mm

Page 82

The plate gap-type filter insert consists of ring-shaped steel discs piled up on a central pin. The gap width between the discs is determined by spacers between the discs. A stationary gap cleaner runs through each gap. As the liquid flows between the discs, dirt particles in the liquid are deposited on the surfaces of the gap. When the handle of the filter insert is turned the dirt particles gather on the row of gap cleaners and sink to the sludge collection chamber where the sludge is discharged by opening a ball valve.

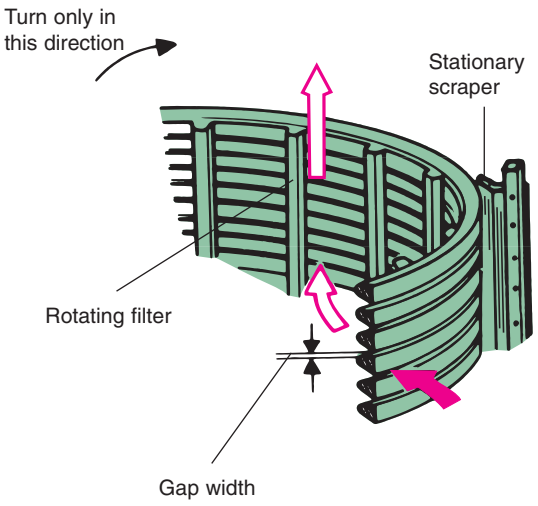




Wire gap-type filters for gap widths ≥ 0.03 mm

Page 84

The wire gap-type insert consists of a non-rusting, high tensile steel wire wound in a spiral around an aluminium frame. The exact position of the steel wire on the frame provides for equal gaps. As the liquid to be filtered flows through the insert dirt particles are deposited in the gaps. When the handle of the filter insert is turned the dirt particles are scraped by a stationary cleaner and sink to the sludge collection chamber where the sludge is discharged by opening a ball valve.



Gap-type tube filters for gap widths ≥ 0.03 mm

Page 85

The gap-type tube filter insert consists of a wire wound around longitudinal rods welded together at every crossing point. The longitudinal rods and wire are made of non-rusting, high tensile steel. The exact position of the steel wire on the longitudinal rods provides for equal gaps. As the liquid to be filtered flows through the filter insert the dirt particles are deposited in the gaps. When the handle on the filter insert is turned, the dirt particles are removed by a stationary scraper and fall down into the sludge collection chamber. The sludge is discharged by opening a ball valve.

Plate gap-type filters

Operating pressure: 10/40 bar – Highly viscous liquids

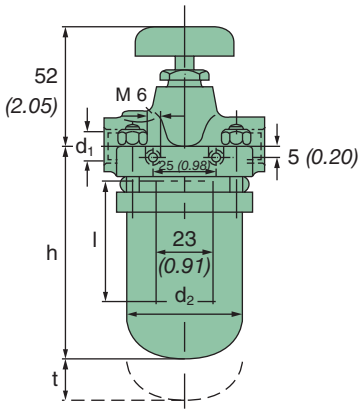


Fig. 1 Filter bowl removable from below

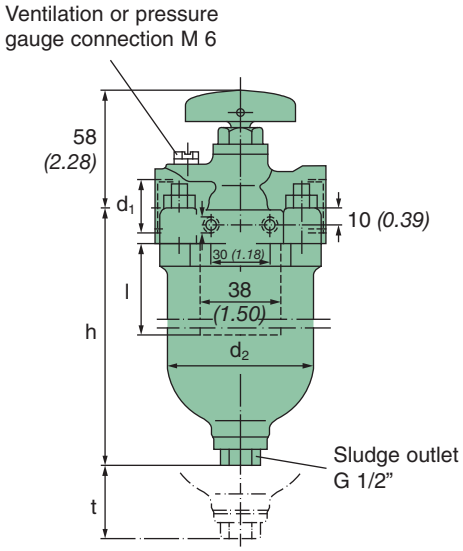


Fig. 2 Filter bowl removable from below

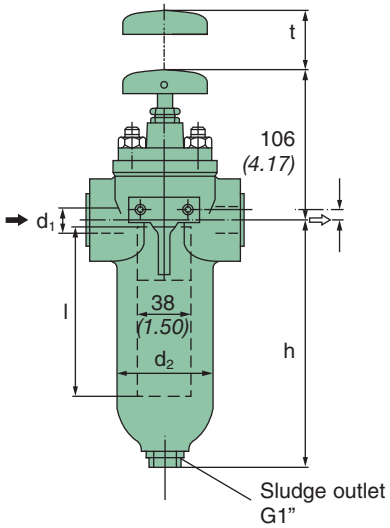
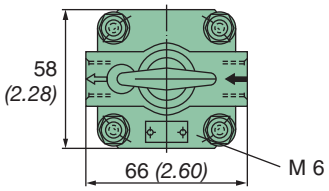
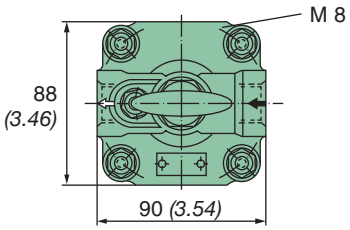
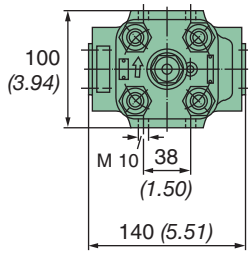


Fig. 3 Filter insert removable from above







Part no.	Fig.	Nominal flow rate [l/h] *[gph]* with gap width 100 µm x = 3	200 µm x = 5	Dimensions in mm *(Dimensions in inches)* d_1	d_2	h	l	t	Permissible operating pressure [bar]	Housing material	Weight approx. [kg]
51 204 6X 021	1	450 *(118.89)*	–	M 14x1.5	47 *(1.85)*	75 *(2.95)*	32 *(1.26)*	50 *(1.97)*	10	Spheroidal graphite cast iron/steel	1.0
51 207 6X 021	1	900 *(237.78)*	–	M 14x1.5	47 *(1.85)*	125 *(4.92)*	70 *(2.76)*	85 *(3.35)*	10	Spheroidal graphite cast iron/steel	1.0
51 305 6X 041	2	1400 *(369.88)*	3500 *(924.70)*	M 22x1.5	77 *(3.03)*	142 *(5.59)*	50 *(1.97)*	90 *(3.54)*	40	Spheroidal graphite cast iron/steel	3.0
51 305 6X 051	2	1400 *(369.88)*	3500 *(924.70)*	G 1/2"	77 *(3.03)*	142 *(5.59)*	50 *(1.97)*	90 *(3.54)*	40	Spheroidal graphite cast iron/steel	3.0
51 305 6X 061	2	1400 *(369.88)*	4000 *(1056.80)*	G 3/4"	77 *(3.03)*	142 *(5.59)*	50 *(1.97)*	90 *(3.54)*	40	Spheroidal graphite cast iron/steel	3.0
51 310 6X 041	2	2600 *(686.92)*	3500 *(924.70)*	M 22x1.5	77 *(3.03)*	192 *(7.56)*	95 *(3.74)*	140 *(5.51)*	40	Spheroidal graphite cast iron/steel	3.0
51 310 6X 051	2	2600 *(686.92)*	3500 *(924.70)*	G 1/2"	77 *(3.03)*	192 *(7.56)*	95 *(3.74)*	140 *(5.51)*	40	Spheroidal graphite cast iron/steel	3.0
51 310 6X 071	2	2600 *(686.92)*	4500 *(1188.90)*	G 3/4"	77 *(3.03)*	192 *(7.56)*	95 *(3.74)*	140 *(5.51)*	40	Spheroidal graphite cast iron/steel	3.0
51 310 7X 101	3	2600 *(686.92)*	5000 *(1321)*	G 1"	78 *(3.07)*	180 *(7.09)*	95 *(3.74)*	180 *(7.09)*	10	Spheroidal graphite cast iron	6.0
51 318 7X 101	3	5000 *(1321)*	5000 *(1321)*	G 1"	77 *(3.03)*	295 *(11.61)*	180 *(7.09)*	280 *(11.02)*	10	Spheroidal graphite cast iron	8.0

Plate gap-type filters

Operating pressure: 16/40 bar – Highly viscous liquids

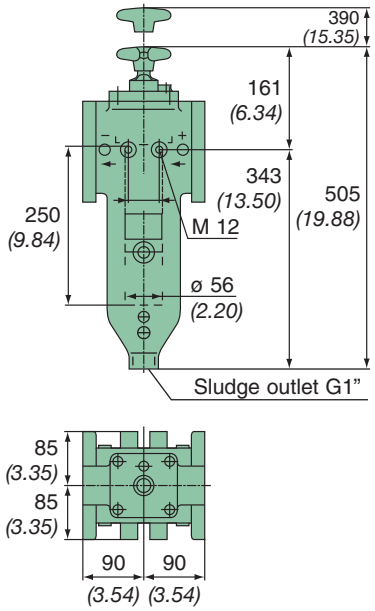


Fig. 1

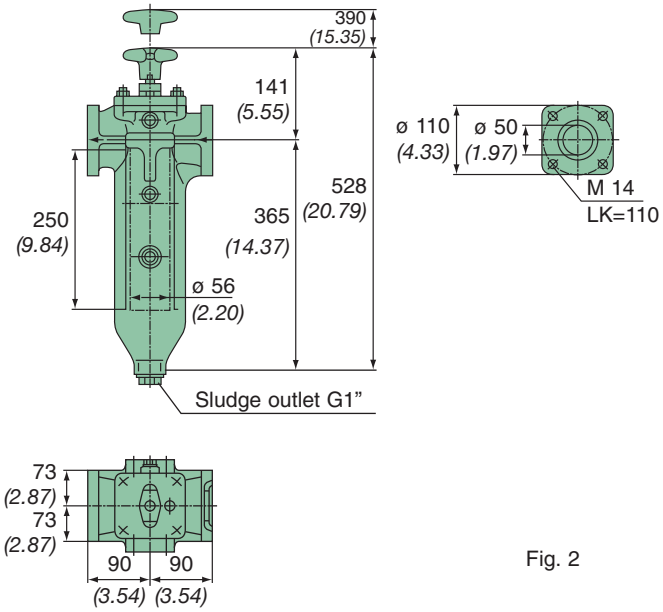


Fig. 2

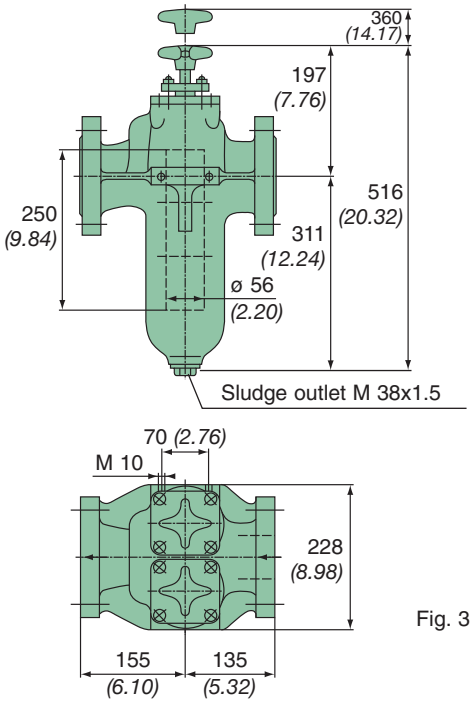


Fig. 3

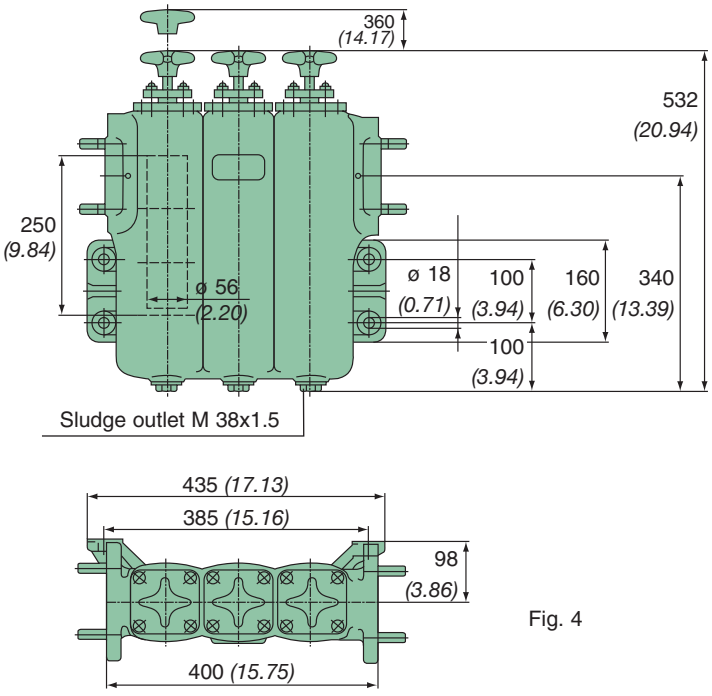
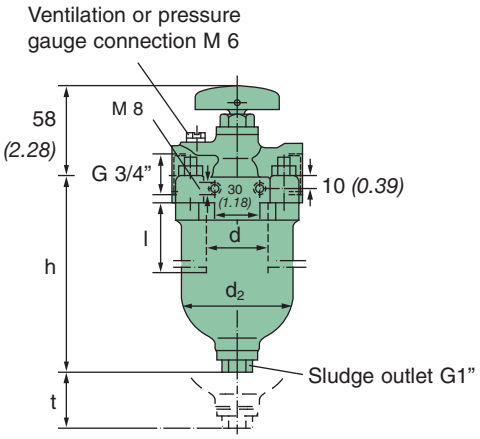


Fig. 4

Part no.	Fig.	Nominal flow rate [l/h] *[gph]* with gap width 100 µm x = 3	Nominal flow rate [l/h] *[gph]* with gap width 200 µm x = 5	Connection flange DN	Connection flange PN	Permissible operating pressure [bar]	Housing material	Weight approx. [kg]
51 525 7X 784	1	12000 *(3170.4)*	15000 *(3963)*	50	40	40	Aluminium	10
51 525 7X 104	2	12000 *(3170.4)*	15000 *(3963)*	50	40	40	SG Iron	20
55 550 7X 251	3	24000 *(6340.8)*	30000 *(7926)*	65	40	16	SG Iron	50
55 575 7X 221	4	36000 *(9511.2)*	45000 *(11889)*	65	40	16	SG Iron	65

Wire gap-type filters

Operating pressure: 40 bar – Fuels and lubricants



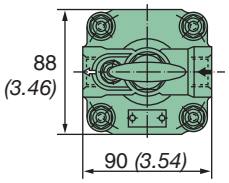
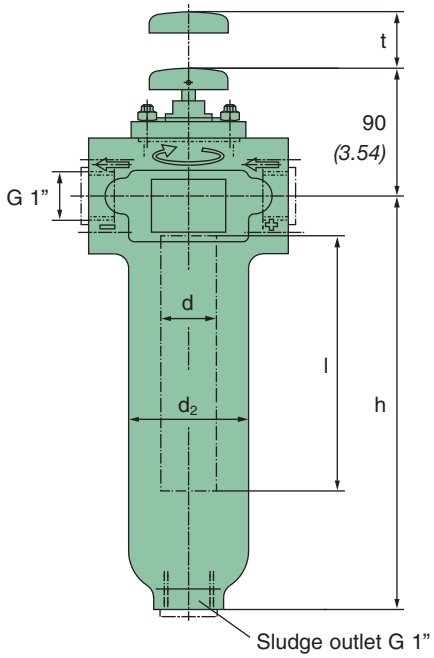
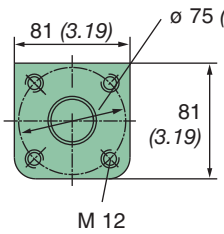


Fig. 1 Filter bowl removable from below





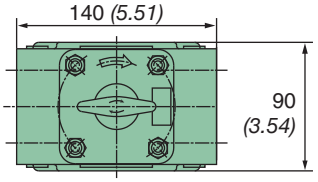
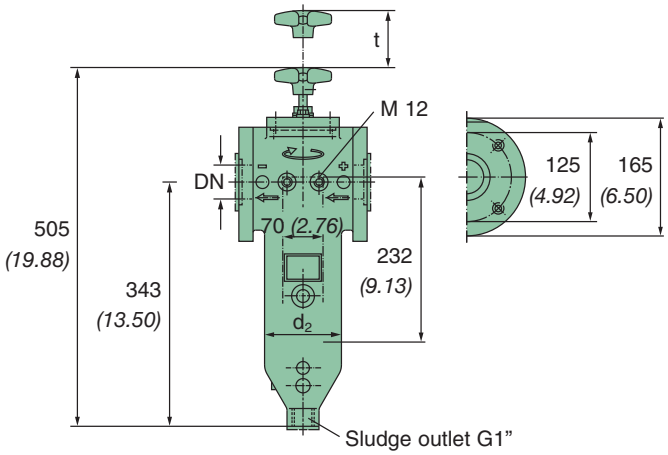


Fig. 2 Filter insert removable from above



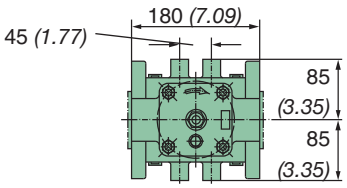


Fig. 3 Filter insert removable from above

Part no.	Fig.	Nominal flow rate [l/h] *[gph]* with gap width				Dimensions in mm *(Dimensions in inches)*					Permissible operating pressure [bar]	Housing material	Weight approx. [kg]
		30 µm x = 0	50 µm x = 1	100 µm x = 3	200 µm x = 5	d	d_2	h	l	t			
53 410 6X 061	1	1100 *(290.62)*	2000 *(528.40)*	3000 *(792.60)*	3500 *(924.70)*	42 *(1.65)*	77 *(3.03)*	195 *(7.68)*	95 *(3.74)*	140 *(5.51)*	40	SG Iron	2.9
53 418 7X 101	2	2100 *(554.82)*	3900 *(1030.38)*	5000 *(1321)*	5000 *(1321)*	42 *(1.65)*	84 *(3.31)*	290 *(11.42)*	165 *(6.50)*	260 *(10.24)*	40	Aluminium alloy	4.2
53 524 7X 191	3	3400 *(898.28)*	6300 *(1664.46)*	13500 *(3566.71)*	15000 *(3963)*	56 *(2.20)*	108 *(4.25)*	343 *(13.50)*	232 *(9.13)*	360 *(14.17)*	40	Aluminium alloy	9.2

Gap-type tube filters

Operating pressure: 40 bar – Watery and/or aggressive liquids

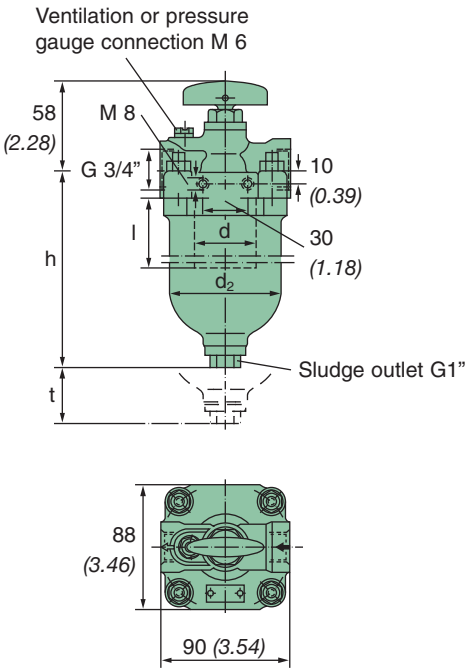


Fig. 1 Filter bowl removable from below

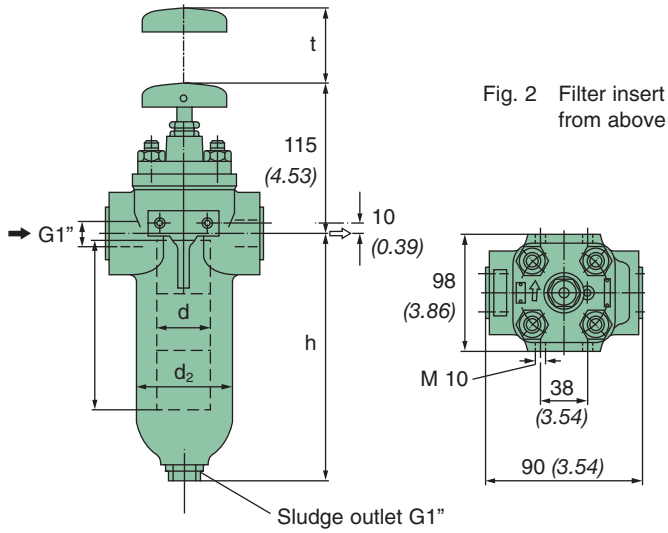


Fig. 2 Filter insert removable from above

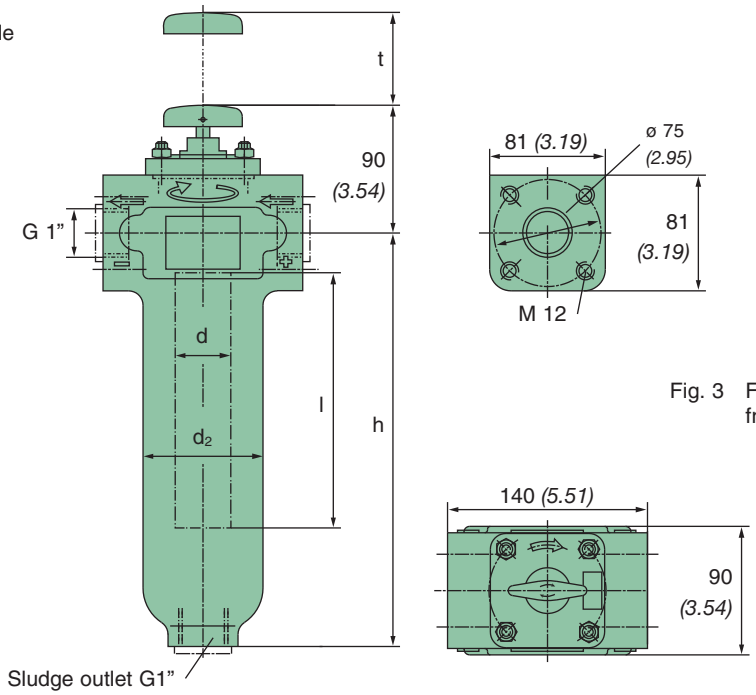


Fig. 3 Filter insert removable from above

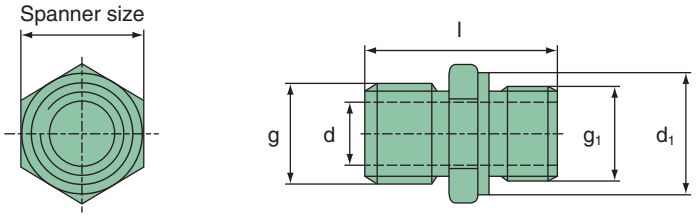
Part no.	Fig.	Nominal flow rate [l/h] *[gph]* with gap width 50 µm x = 1	100 µm x = 3	200 µm x = 5	Dimensions in mm *(Dimensions in inches)* d	d_2	h	l	t	Permissible operating pressure [bar]	Housing material	Weight approx. [kg]
54 310 6X 061	1	1100 *(290.62)*	2000 *(528.40)*	3000 *(792.60)*	38 *(1.50)*	77 *(3.03)*	194 *(7.64)*	100 *(3.94)*	140 *(5.51)*	40	SG Iron	3.5
54 310 7X 135	2	1100 *(290.62)*	2000 *(528.40)*	3000 *(792.60)*	38 *(1.50)*	84 *(3.31)*	161 *(6.34)*	100 *(3.94)*	200 *(7.87)*	40	CrNi Steel	7.0
54 310 7X 165	3	1100 *(290.62)*	2000 *(528.40)*	3000 *(792.60)*	38 *(1.50)*	84 *(3.31)*	180 *(7.09)*	100 *(3.94)*	200 *(7.87)*	40	Aluminium alloy	4.0
54 318 7X 104	3	1900 *(501.98)*	3500 *(924.70)*	5000 *(1321)*	38 *(1.50)*	84 *(3.31)*	380 *(14.96)*	289 *(11.38)*	280 *(11.02)*	40	Aluminium alloy	4.5


MANN+HUMMEL

MANN+HUMMEL Accessories for liquid filters

Double connector for MANN+HUMMEL spin-on filters

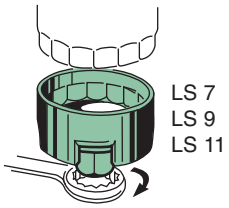
If the mounting plate for the spin-on filter has an internal thread, you will need a double connector to fit the filter.



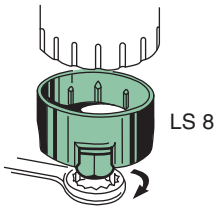
Part no.	Dimensions in mm *(Dimensions in inches)*					
	g	g_1	d	d_1	l	Spanner size
21 019 15 111	M 18x1,5	3/4” - 16 UNF	13 *(0.51)*	–	35,5 *(1.40)*	24 *(0.94)*
21 020 15 131	M 20x1,5	3/4” - 16 UNF	13 *(0.51)*	–	30,5 *(1.20)*	24 *(0.94)*
21 024 15 121	M 24x1,5	3/4” - 16 UNF	13 *(0.51)*	–	37 *(1.46)*	27 *(1.06)*
21 024 15 131	M 24x1,5	M 20x1,5	14 *(0.55)*	–	37 *(1.46)*	27 *(1.06)*
21 025 15 101	M 24x1,5	1”- 12 UNF	18 *(0.71)*	–	37 *(1.46)*	27 *(1.06)*
21 030 15 251	M 30x1,5	1 1/8” - 16 UN	22 *(0.87)*	–	40 *(1.57)*	32 *(1.26)*
21 032 15 211	M 32x1,5	M 30x1,5	18 *(0.71)*	–	42 *(1.65)*	36 *(1.42)*
21 039 15 101	M 38x1,5	1 1/2” - 16 UN	30 *(1.18)*	–	41 *(1.61)*	46 *(1.81)*
21 039 15 171	1 1/2” - 16 UN	M 36x1,5	25 *(0.98)*	–	42,5 *(1.67)*	41 *(1.61)*

Filter wrench for MANN+HUMMEL spin-on filters

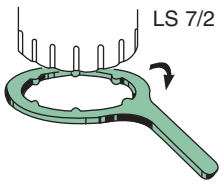
Enables easy removal of a MANN+HUMMEL spin-on filter.



Form B
Form C



Form D



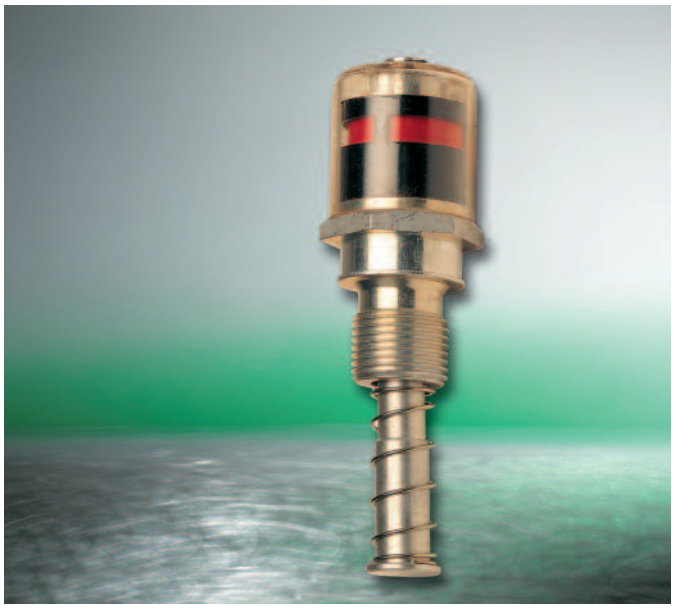
Form D

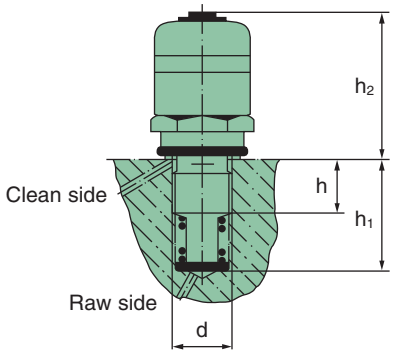
MANN-FILTER	**W 7 ...**		**W 8 ...**	**W 9 ...**	**W 11 ...**
Form of the spin-on filter	C	D	D	B	C
Suitable MANN+HUMMEL filter wrench	LS 7	LS 7/2	LS 8	LS 9	LS 11

For form A with a wrench profile (see page 9) the tool can be a strong screwdriver or a round bar between 8 and 10 mm thick.
The filter wrench for form E (see page 9) can be a standard strap wrench.

MANN+HUMMEL Service indicators for in-line filters and high pressure filters

MANN+HUMMEL service indicators signal the time for maintenance for filter inserts full of dirt particles by the display of a red signal ring in a display. The permissible operating temperature is 120 °C.



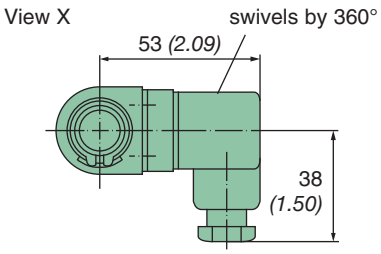


Part no.	Dimensions in mm *(Dimensions in inches)*				Permissible operating pressure	Switching pressure
	d	h	h_1	h_2	[bar]	[bar]
59 020 79 201	M 18x1.5	22 *(0.87)*	36 *(1.42)*	46 *(1.81)*	25	1.0
59 020 79 202	M 18x1.5	22 *(0.87)*	36 *(1.42)*	46 *(1.81)*	25	1.8
59 020 79 208	M 18x1.5	22 *(0.87)*	36 *(1.42)*	46 *(1.81)*	25	1.4
59 020 79 242	M 18x1.5	22 *(0.87)*	36 *(1.42)*	46 *(1.81)*	25	2.2
59 020 79 212	M 10x1.5	16 *(0.63)*	–	44 *(1.73)*	25	1.8
59 020 79 315	M 24x2.0	19 *(0.75)*	44.5 *(1.75)*	44 *(1.73)*	400	5.0

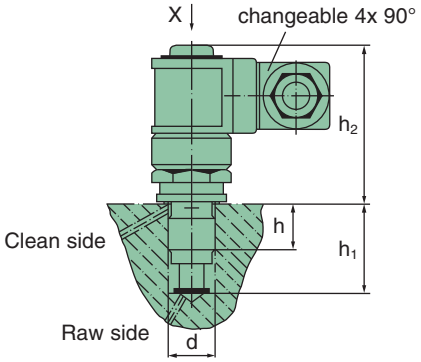
MANN+HUMMEL Service switches for in-line filters and high pressure filters

When the time for maintenance has come an electromagnetic switch actuates a signal (e.g. lamp, buzzer) or a disconnection device.

- Operating temperature: max. 120 °C
- Switching type: the default switching type is listed in the table below (make/ break contact).
  The customer can change the setting by rearranging the contacts.
- Switching capacity: max. 12 W / 18 VA
- Starting current: max. 0.8 A
- Protection class: IP 65 all-insulated



Connection for cable diameter
4.5 up to 7 mm *(0.18 up to 0.28 inches)*



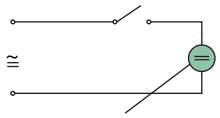
Part no.	Dimensions in mm *(Dimensions in inches)*				Permissible operating pressure [bar]	Switching pressure [bar]	Contact type	Main application
	d	h	h_1	h_2				
59 010 79 201	M 18x1.5	22 *(0.87)*	36 *(1.42)*	62.5 *(2.46)*	25	1.0	Make contact	Oil
59 010 79 202	M 18x1.5	22 *(0.87)*	36 *(1.42)*	62.5 *(2.46)*	25	1.8	Make contact	Oil
59 010 79 205	M 18x1.5	22 *(0.87)*	36 *(1.42)*	62.5 *(2.46)*	25	1.8	Break contact	Fuel
59 010 79 206	M 18x1.5	22 *(0.87)*	36 *(1.42)*	62.5 *(2.46)*	25	0.8	Break contact	Oil
59 010 79 208	M 18x1.5	22 *(0.87)*	36 *(1.42)*	62.5 *(2.46)*	25	1.4	Make contact	Oil
59 010 79 232	M 18x1.5	22 *(0.87)*	36 *(1.42)*	62.5 *(2.46)*	25	1.8	Make contact	Fuel
59 010 79 241	M 18x1.5	22 *(0.87)*	36 *(1.42)*	62.5 *(2.46)*	25	1.0	Break contact	Fuel
59 010 79 252	M 18x1.5	22 *(0.87)*	36 *(1.42)*	62.5 *(2.46)*	25	2.2	Break contact	Oil
59 010 79 305	M 24x2.0	19 *(0.75)*	59.5 *(2.34)*	61 *(2.40)*	400	5.0	Make contact	Oil
59 010 79 315	M 24x2.0	19 *(0.75)*	57.5 *(2.26)*	61 *(2.40)*	400	5.0	Make contact	Oil
59 010 79 405	M 18x2.0	7.5 *(0.30)*	30 *(1.18)*	62.5 *(2.46)*	175	5.0	Make contact	Oil

MANN+HUMMEL Service switches for in-line filters and high pressure filters

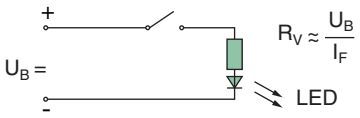
Instructions for electrical installation of the service switch

The service switch is equipped with a high quality electromagnetic switch (reed switch). In order to achieve a reliable function, please observe the following:

1. For an electrical or optical display we recommend use of a glow lamp or LED. Both can be directly switched without a spark quenching device.

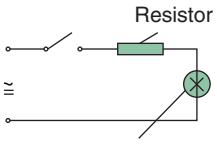


Glow lamp



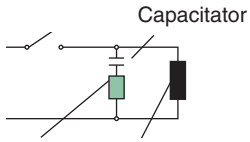
Dimension the R_V so that I_F is approx. 15 ... 20 mA

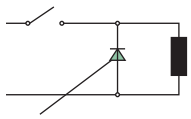
2. Filament lamps require a very high starting current relative to their load current. The lamp and a series resistor should be dimensioned such that the maximum load of the switch (see rating plate) is not exceeded when switching on. We recommend selecting the series resistor such that the switch has the max. load without consideration of the glow lamp resistance. It is thereby protected against overload but the glow lamp lights up with low voltage.



Filament lamp

3. When switching inductive loads voltage peaks can be induced which in some circumstances may cause the service switch to malfunction. For alternating current an RC combination should be connected parallel to the relay or contactor coil and with direct current a freewheeling diode (e.g. diode 1 N 4007) in reverse direction.





Freewheeling diode

When dimensioning the spark quenching device the instructions of the respective contactor or relay should be observed.

In both cases the maximum load for the switch (see rating plate) must not be exceeded.


MANN+HUMMEL

Technical Annex

Filter glossary

$ß_x$ value
The beta value is the ratio of a quantity of particles of a given size of the particle upstream of the filter to the quantity of these particles found downstream from the element. Example: Upstream there are 75 particles of the size 3 µm and downstream there is only one such particle. The filter then has the characteristics $ß_3 >= 75$. The conversion to separation efficiency is as follows: $\eta = 1-1/ß_x$.

Bursting pressure
The failure of a filter element as fluid flows from the inside to the outside as a result of excessive differential pressure or too high a static pressure.

Bypass valve
The bypass valve ensures the oil flow to the lubrication point, e.g. with a cold-start, thick oil or a clogged filter.

Coalescence
The behaviour of small droplets in fluids whereby varying surface tensions and forces of cohesion cause the droplets combine to form larger droplets. This effect is used in preliminary fuel filters for the separation of water.

Collapse pressure
The failure of the filter through collapsing as the liquid flows from the outside to the inside as a result of excessive differential pressure over the filter.

Deep-bed filters
Dirt particles penetrate the filter medium and retained by the structure of the filter medium. The design of the deep-bed filter allows the highest filter fineness and high dirt holding capacity. Deep-bed filters are replaced at the end of the product life. It is usually not possible to clean them.

Differential pressure
In a filter this is the pressure difference between the raw and clean side.

Dirt holding capacity [g]
The dirt holding capacity of a filter or filter element is the mass of the dirt under test conditions which is added until the agreed end of the test.

Dirt load
The amount of dirt particles the filter is confronted with.

Filter cake
This is formed by separated particles which are deposited on the surface of the element. The filter cake has the effect of an additional filter, but also increases the flow resistance.

Filter dimensioning
This mainly depends on the factors of volume flow, filter fineness, amount of dirt particles and the required service life of the filter.

Filter element
This is the component without the housing which is responsible for the actual filtration process.

Full flow
The complete oil volume flows through the filter.

Gap-type filters
Surface-type filters
Filters which separate dirt particles using a filter element with a defined gap width, e.g. through layers of plates or discs or wound wire.

Graded medium
The description of a single-layer fuel filter medium with a high initial separation efficiency and high dirt holding capacity. The medium is more open on the inflow side than on the outflow side.

In-line filters
Filters fitted in pipe or hose lines.

Micron specifications
In connection with fuel filters common reference is made to µm specifications without reference to a test standard. In this catalogue all the separation efficiencies are according to ISO. In order to compare the MANN+HUMMEL media with the micron specifications commonly used elsewhere, please use the following table:

MANN+HUMMEL medium	Application	Filter fineness acc. to common micron references
Multigrade PF	Preliminary filter	10 µm
Multigrade PFO	Preliminary filter	30 µm
Graded medium	Main filter	5 µm
Multigrade HC	Main filter	5 µm
Multigrade HE	Main filter	2 µm
Multigrade HE+	Main filter	1 µm

Filter glossary

Medium
Material used to carry out the filtration.

Multigrade
Description of a high performance, multi-layer medium for a fuel filter.

Multipass test for oil filters
Defined in ISO 4548-12 with calibration acc. to ISO 16 889. A defined amount of particles are added until a defined differential pressure over the filter element is reached. This results in the separation efficiency characteristic over time, the ß value and the filter service life.

Nominal flow rate [l/min]
The nominal flow rate relates closely to the geometric dimensioning data of the filter (nominal connection diameter, filter fineness) and the physical characteristics of the liquid to be filtered (density, viscosity).

Nominal pressure [bar/mbar/kPa]
The filter is dimensioned to handle this pressure.

Opening pressure [bar, kPa]
The pressure difference when the bypass valve is opened, characterised by a defined volume flow.

Operating pressure [bar, mbar, kPa]
The filter is dimensioned to work at this operating pressure.

Partial flow
A partial flow is diverted between the pump and lubrication points and then immediately directed to the oil sump via a partial-flow filter. The partial-flow filter is considerably finer than a full-flow filter and primarily reduces the soot particle content in the lube oil.

Particle separation efficiency for a fuel filter
Specifications for the initial separation efficiency are according to ISO 13 353.

PreLine
The MANN+HUMMEL brand name for a preliminary fuel filter with water separation. The filter is equipped with the patented multigrade medium.

Separation efficiency [%]
Ratio of the dirt particles retained by the filter to the dirt particles present.

Separation efficiency, absolute
In one flow through the filter 99% of the particles of a given size are separated. Example: 15 µm absolute. Particles of the size 15 µm are 99% separated in one flow through the filter.

Separation efficiency, fractional [%]
The separation efficiency for a given particle size. Determined by a multipass test.

Separation efficiency, nominal
In one flow through the filter 50% of the particles of a given size are separated. Example: 15 µm nominal. Particles of the size 15 µm are 50% separated in one flow through the filter.

Spin-on filters
Filters where maintenance simply requires replacing the complete filter with integrated filter element.

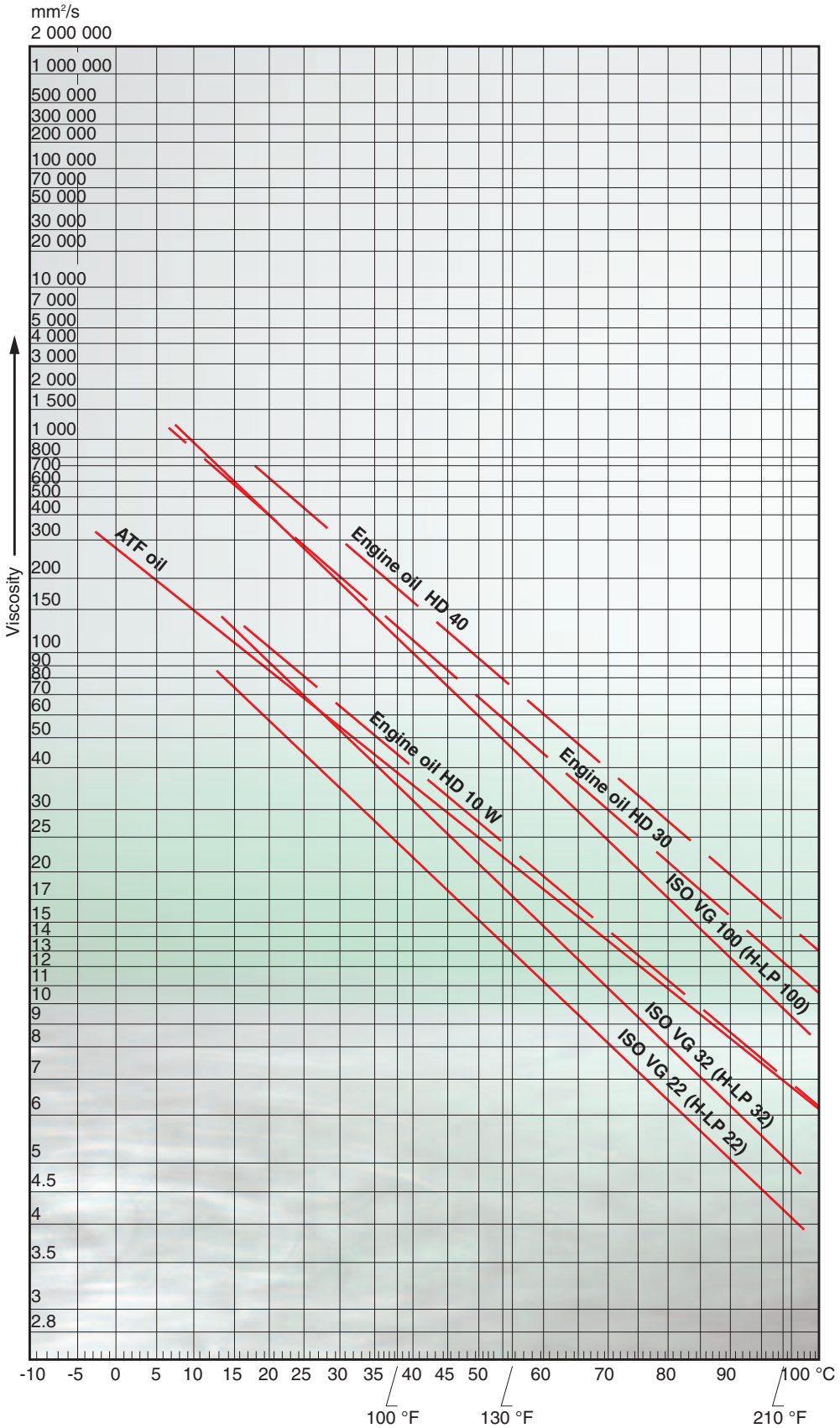
Surface-type filters
Dirt particles collect on the surface of the filter element. The formation of a filter cake enables the additional separation of particles smaller than the pore size of the filter element. It is usually possible to clean surface-type filters.

Viscosity
The dynamic viscosity is a measurement of the thickness of the liquid medium to be filtered. The kinematic viscosity is the ratio of the dynamic viscosity of the medium to its density.

Water separation efficiency for fuel filter
Specifications for water separation are according to ISO 4020.

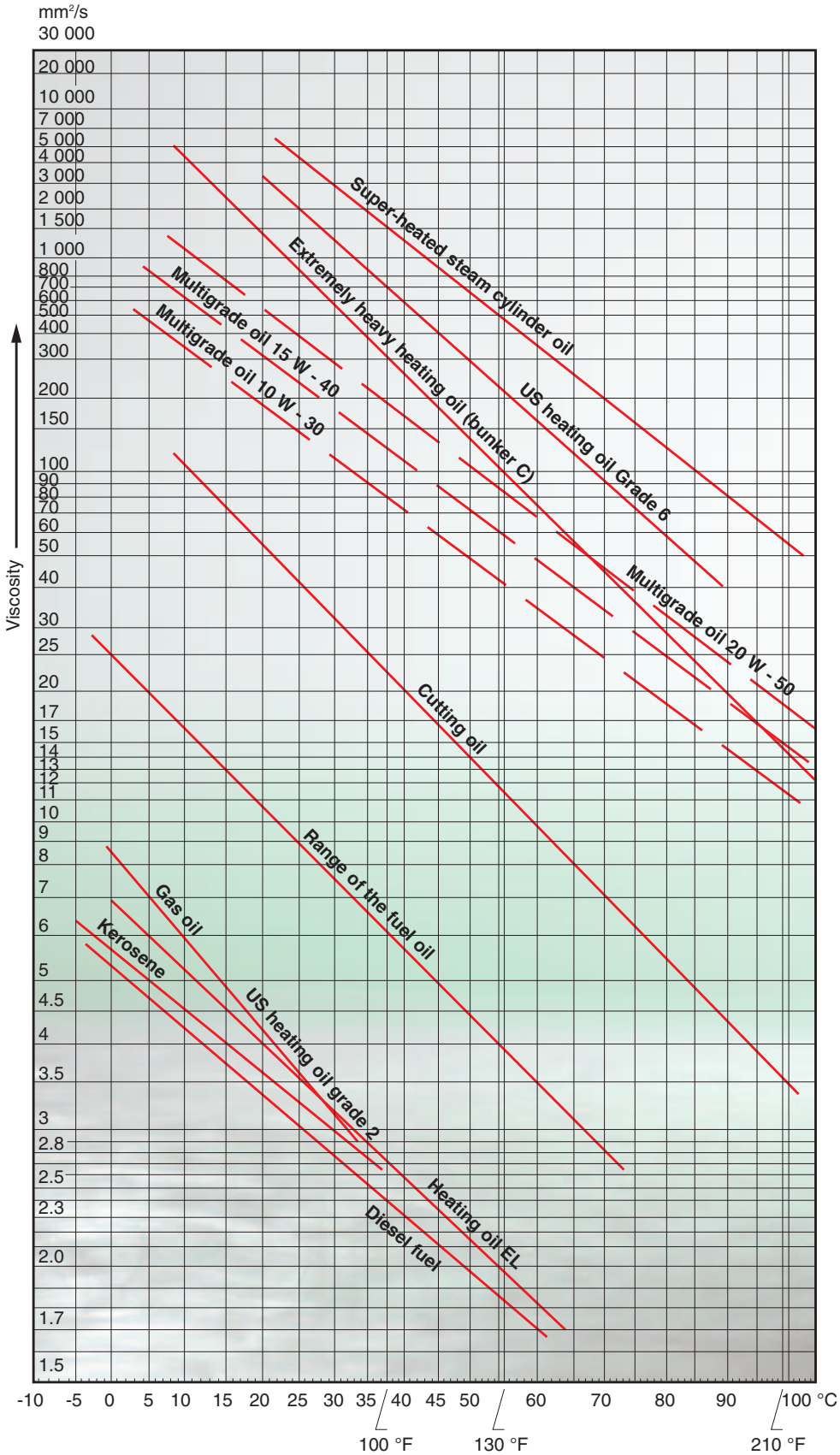
Viscosity/temperature characteristics

Examples for commonly available single grade engine oils, hydraulic oils and ATF oils



Viscosity/temperature characteristics

Examples for commonly available multigrade engine oils, cutting oils and heating oils



List of contents acc. to part numbers

List of contents acc. to part numbers

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Conversion table

Flow rates

10 l/min	=	2.64 gpm
20 l/min	=	5.28 gpm
30 l/min	=	7.93 gpm
40 l/min	=	10.57 gpm
50 l/min	=	13.21 gpm
60 l/min	=	15.85 gpm
70 l/min	=	18.49 gpm
80 l/min	=	21.14 gpm
90 l/min	=	23.78 gpm
100 l/min	=	26.42 gpm
150 l/min	=	39.63 gpm
200 l/min	=	52.84 gpm
250 l/min	=	66.05 gpm
300 l/min	=	79.26 gpm
350 l/min	=	92.47 gpm
400 l/min	=	105.68 gpm
450 l/min	=	118.89 gpm
500 l/min	=	132.10 gpm
600 l/min	=	158.52 gpm
700 l/min	=	184.94 gpm
800 l/min	=	211.36 gpm
900 l/min	=	237.78 gpm
1000 l/min	=	264.20 gpm

100 l/h	=	26.42 gph
110 l/h	=	29.06 gph
120 l/h	=	31.70 gph
130 l/h	=	34.35 gph
140 l/h	=	36.99 gph
150 l/h	=	39.63 gph
160 l/h	=	42.27 gph
170 l/h	=	44.91 gph
180 l/h	=	47.56 gph
190 l/h	=	50.20 gph
200 l/h	=	52.84 gph
300 l/h	=	79.26 gph
400 l/h	=	105.68 gph
500 l/h	=	132.10 gph
600 l/h	=	158.52 gph
700 l/h	=	184.94 gph
800 l/h	=	211.36 gph
900 l/h	=	237.78 gph
1000 l/h	=	264.20 gph

Pressure

0.1 bar	=	1.45 psi
0.12 bar	=	1.74 psi
0.5 bar	=	7.25 psi
1 bar	=	14.5 psi
2 bar	=	29 psi
2.5 bar	=	36.25 psi
3 bar	=	43.5 psi
5 bar	=	72.5 psi
10 bar	=	145 psi
14 bar	=	203 psi
20 bar	=	290 psi
25 bar	=	362.5 psi
30 bar	=	435 psi
35 bar	=	507.5 psi
40 bar	=	580 psi
100 bar	=	1450 psi
200 bar	=	2900 psi
300 bar	=	4350 psi
400 bar	=	5800 psi

Length

10 mm	=	0.39 inch
20 mm	=	0.79 inch
30 mm	=	1.18 inch
40 mm	=	1.57 inch
50 mm	=	1.97 inch
60 mm	=	2.36 inch
70 mm	=	2.76 inch
80 mm	=	3.15 inch
90 mm	=	3.54 inch
100 mm	=	3.94 inch
150 mm	=	5.91 inch
200 mm	=	7.87 inch
250 mm	=	9.84 inch
300 mm	=	11.81 inch
350 mm	=	13.78 inch
400 mm	=	15.75 inch
450 mm	=	17.72 inch
500 mm	=	19.69 inch

Volume

100 cm^3	=	6.102 $inch^3$
200 cm^3	=	12.204 $inch^3$
300 cm^3	=	18.306 $inch^3$
400 cm^3	=	24.408 $inch^3$
500 cm^3	=	30.51 $inch^3$
600 cm^3	=	36.612 $inch^3$
700 cm^3	=	42.714 $inch^3$
800 cm^3	=	48.816 $inch^3$
900 cm^3	=	54.918 $inch^3$
1000 cm^3	=	61.02 $inch^3$
5000 cm^3	=	305.1 $inch^3$
10000 cm^3	=	610.2 $inch^3$

Temperature

-30 °C	=	-22.0 °F
-10 °C	=	14.0 °F
0 °C	=	32.0 °F
10 °C	=	50.0 °F
30 °C	=	86.0 °F
50 °C	=	122.0 °F
80 °C	=	176.0 °F
100 °C	=	212.0 °F
120 °C	=	248.0 °F

Selection from the MANN+HUMMEL industrial filters catalogue program

ProVent

For crankcase ventilation

Catalogue order no.
19 944 10 100 de
19 944 10 101 en
19 944 10 102 fr
Further languages available on request.

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CompacPlus
Europiclon
Vacuum filter

Catalogue order no.
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19 941 10 102 fr
Further languages available on request.

Air/oil separators for compressors and vacuum pumps

Air/oil separators
Air/oil boxes

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19 943 00 101 en
19 943 00 102 fr
Further languages available on request.

MANN-FILTER

Filter elements in OEM quality for construction and agricultural machines:
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- Oil filters
- Fuel filters
- Hydraulic filters
- Cabin filters

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MANN+HUMMEL company

Joint venture company

MANN+HUMMEL Group

The MANN+HUMMEL Group is an international company with its headquarters in Ludwigsburg, Germany. The group employs more than 10,000 people worldwide at more than 41 locations.

The company develops, produces and sells technically complex components and systems for the automotive industry and many other fields. A key area is high quality filtration products for vehicles, engines and industrial applications. The OEM business with global market leaders and producers of vehicles, machines and installations defines the quality and performance of the products. Filters for the international aftermarket are sold under a variety of international brands as well as under the MANN-FILTER brand.

MANN+HUMMEL Industrial Filters

The Industrial Filters Business Unit has its headquarters in Speyer, Germany. The business unit is specialized in meeting the special requirements of off-highway vehicles and engine applications, compressed air and vacuum technology, mechanical engineering and plant construction.

MANN+HUMMEL Industrial Filters offers high performance for these fields and other fields which have a requirement for the filtration and separation of air, gas and liquids.

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