Vacuum Traps and Filters

Adsorption Traps

Single-Stage Vacuum Traps

Multi-Stage Vacuum Traps

Filter Media for Vacuum Traps

Oil Mist Eliminators

Contents

Introduction

This chapter includes our wide range of vacuum traps and oil mist separators which are necessary to protect pumps or your complete vacuum system against damage by water, solvent and oil vapor, particles, reactive solids or condensates. Different solutions come into consideration depending on the application.

When selecting a vacuum trap, three criteria have to be considered: the medium that should be filtered with the trap, the required ports for the connection with the vacuum system and the needed design of the trap.

Based on the medium to be filtered, one has to decide what kind of trap and which filter media come into question. There is the possibility to prevent back-streaming of mechanical rough pumps into the vacuum chamber, to reduce the emissions of the pumps or to protect the pumps against particles from the vacuum system. Furthermore, it is possible to filter gases for the process in the chamber and to prevent water and process related condensates. A LN_2 cooling trap can, with some reservations, also be used as a cryo pump.

The connections of the trap also depend on the design of the vacuum system into which it will be integrated. It is important to ensure that the selected connection system complies with the pressure range of the vacuum system.

Also the design of the trap is mostly determined by the system into which it will be integrated. The ports can be axially staggered or positioned at 90° from each other.

The volume of the trap has to be selected according to the prevailing amount of gas. The higher the quantity of gas which has to be filtered the larger has to be the volume of the selected trap. Furthermore, the maintenance intervals are extended by higher volume of the traps.

LN_2 cooling traps with liquid nitrogen are used in high vacuum systems in order to achieve a directed condensation on the cooled surfaces. Water, solvent and oil vapors together with CO_2 condensate on the cooling areas.

A KF adsorption trap can be applied in order to prevent the back-streaming of oil or water vapor from the rough vacuum system into the chamber. The zeolite, mostly used as adsorption medium, can be regenerated by the integrated heating.

Single- and multi-stage vacuum traps are suited to protect pumps or the whole vacuum system against damages arising by particles, reactive substances or condensates. Sealed filter cartridges for the different media are used in these traps.

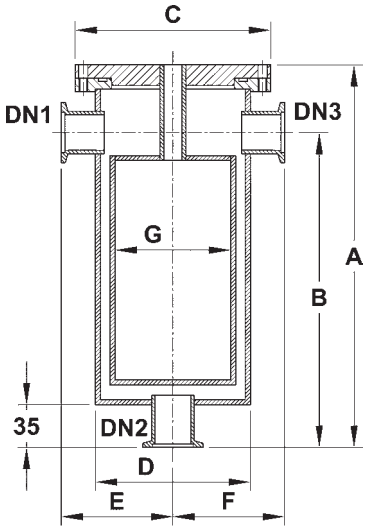
Oil mist separators are applied, if it is necessary, to filter the emissions of mechanical rough pumps. The inserted filter media restrain particles > 0.1 µm with a deposition rate of 99.999 %. Different styles are available according to the size of the pump.

LN_2 Cooling Traps, Stainless Steel

LN_2 cooling traps of stainless steel are mainly used in high vacuum and ultra high vacuum systems.
Water, solvents, agents and gases with boiling temperatures above 77 K (e. g. CO_2) condensate at the walls of the traps. Therefore, cooling traps can also be applied as cryo pumps. The traps are equipped with KF or ISO flanges for assembly and to drain the condensate.

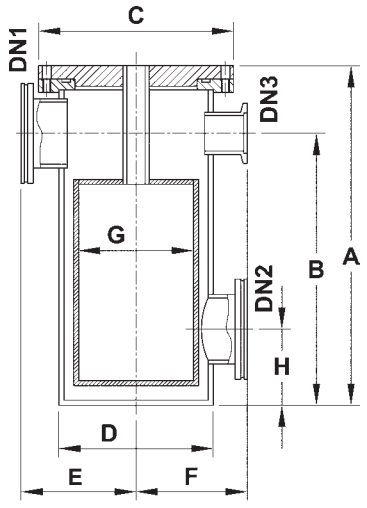
To meet the requirements of your application, there are traps with two or three ports in two designs available.

Design 1



Order code	DN1	DN2	DN3	A	B	C	D	E	F	G
705101	DN25KF	DN25KF	-	260	220	125	104	75	75	78
705102	DN25KF	DN25KF	DN25KF	260	220	125	104	75	75	78
705104	DN40KF	DN40KF	-	260	220	125	104	75	75	78
705105	DN40KF	DN40KF	DN40KF	260	220	125	104	75	75	78
705106	DN50KF	DN50KF	DN40KF	265	220	185	150	90	90	101
705107	DN63KF	DN63KF	DN40KF	320	265	150	129	98	98	101

Design 2



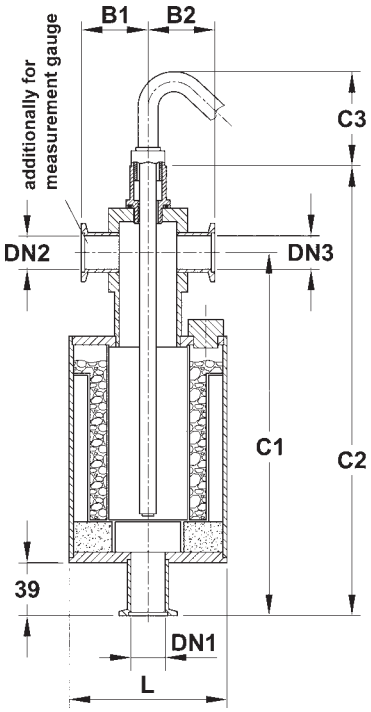
Order code	DN1	DN2	DN3	A	B	C	D	E	F	G	H
705111	DN25KF	DN25KF	-	225	180	125	104	75	78	35	35
705112	DN25KF	DN25KF	DN25KF	225	180	125	104	75	78	35	35
705114	DN40KF	DN40KF	-	225	180	125	104	75	78	35	35
705115	DN40KF	DN40KF	DN40KF	225	180	125	104	75	78	35	35
705116	DN50KF	DN50KF	DN40KF	230	170	150	129	90	101	45	45
705117	DN63KF	DN63KF	DN40KF	295	230	150	129	98	101	65	65

KF Adsorption Traps, Stainless Steel, Including Heater

KF adsorption traps are commonly applied between mechanical rough pumps and the vacuum chamber. They prevent the back-streaming of vapors and pumping oils into the chamber. The traps are normally filled with zeolite which adheres particles on its large surface.

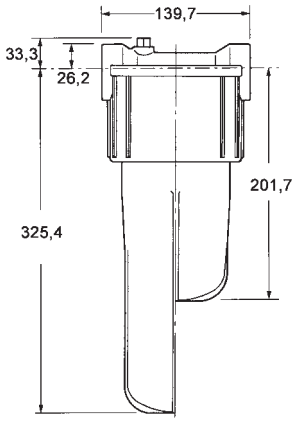
By means of a built-in heating, the zeolite can be regenerated many times at a temperature of 300 °C.

Including Zeolite Filling



Order code	DN1	DN2	DN3	L	B1	B2	C1	C2	C3
FT25KF-J	25	25	25	104	48	48	253	285	85
FT40KF-J	40	40	25	104	50	45	253	285	85
FT50KF-J	50	50	25	130	50	45	260	300	60

VISI-TRAP (Simple Adsorption Trap with Plastic Sump)



The adsorption traps VISI-TRAP consist of a transparent plastic sump with a particle filter to protect pumps against corrosion or vacuum against the back-streaming of oil from the pump.

There are two filter sizes (4.5“ or 9.5“) and a wide range of filter elements and connecting adapters for your individual application available.

Furthermore, you can select from a range of filter cartridges for water, oil or corrosive chemicals which can be replaced without opening the vacuum system.

Technical data

	MV-300005	MV-300010
Sump material	plastics	plastics
Pump size [m^3/h]	1.5 - 6	9 - 30
Filter	stainless steel end caps and screens, Buna N seals	stainless steel end caps and screens, Buna N seals
Ports	3/4" NPT female thread	3/4" NPT female thread
Adapters	hose connection, DN16KF, DN25KF, DN40KF	hose connection, DN16KF, DN25KF, DN40KF
Diameter [mm]	140	140
Total height [mm]	202	325
Space required for change of sump [mm]	40	40

Order code 4.5" version	Order code 9.5" version	Description
MV-300005	**MV-300010**	VISI-TRAP with housing, cap and 3/4" NPT female thread (without filter element)
MV-300105	**MV-300100**	VISI-TRAP with copper gauze (large surface absorbs condensate, particles and oil vapor)
MV-300205	**MV-300200**	VISI-TRAP with stainless steel gauze (same as copper gauze, additional corrosion protection)
MV-300305	**MV-300300**	VISI-TRAP with molecular sieve (reduces pump backstreaming and water vapor)
MV-300405	**MV-300400**	VISI-TRAP with Sodasorb® (filters corrosion particles, chemicals and neutralizes acid vapors)
MV-300505	**MV-300500**	VISI-TRAP with activated charcoal filter (removes organic vapors)
MV-300605	**MV-300600**	VISI-TRAP with aluminium oxide (traps acids, polar compounds, water and particles)
MV-300725	**MV-300720**	replacement sump
MV-301075*		connecting adapter with hose connection on 3/4" NPT
KF16NPT34*		connecting adapter DN16KF on 3/4" NPT
KF25NPT34*		connecting adapter DN25KF on 3/4" NPT
KF40NPT34*		connecting adapter DN40KF on 3/4" NPT
MV-301200		pressure display (0-30" Hg)
MV-301300		ventilation valve
MV-301400		pressure display and ventilation valve pre-assembled

* Two for each trap.

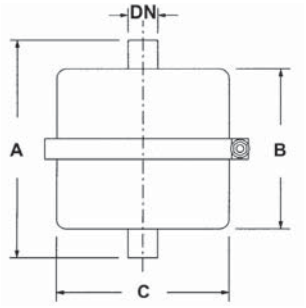
POSI-TRAP (Stainless Steel)

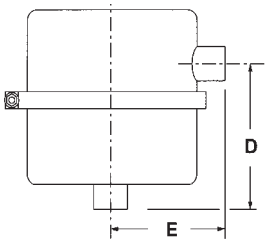
POSI-TRAP 4

POSI-TRAP 8

The POSI-TRAP consists of a stainless steel housing which is available in two sizes. Both models can be equipped with 180° straight-through or 90° right-angle ports. POSI-TRAP filter media are sealed at both the inlet and exhaust to provide trapping of the whole gas stream. A range of filter media is available.

The filter media of the POSI-TRAP are inclusively delivered. You can select the choosen filter element by adding the corresponding filter code.





Material	Filter code	Application
Copper gauze	KG	large surface, absorbs condensate, particles and oil vapor
Stainless steel gauze	SS	same as copper gauze, added corrosion protection
Molecular sieve	MS	reduces oil back-streaming and water vapor
Sodasorb®	SO	traps corrosion particles, chemicals and neutralizes acid vapors
Activated charcoal	AK	traps organic vapors
Aluminium oxide	AA	traps acids, polar compounds, water and particles
PolyPro 2 µm	P2	traps particles to Ø 2 µm
PolyPro 5 µm	P5	traps particles to Ø 5 µm
PolyPro 20 µm	P20	traps particles to Ø 20 µm

Model	Order code	Housing material	Sealing	Number of filters	Version	A	B	C	D	E	DN
4"	MV-330000*	stainless steel	Buna N O-rings	1	180°	195.6	144.8	101.6	-	-	1" hose connection
	MV-335000*				90°	195.5	144.8	101.6	86.4	144.8	
	MV-330025*				180°	203.2	144.8	101.6	-	-	KF25
	MV-335025*				90°	203.2	144.8	101.6	88.9	147.3	
8"	MV-340000*	stainless steel	Buna N O-rings	4	180°	271.8	193	203.2	-	-	1.5" hose connection
	MV-345000*				90°	271.8	193	203.2	137.2	210.8	
	MV-340040*				180°	279.4	193	203.2	-	-	KF40
	MV-345040*				90°	279.4	193	203.2	139.7	213.4	
	MV-340050*				180°	279.4	193	203.2	-	-	KF50
	MV-35040*				90°	279.4	193	203.2	139.7	213.4	

* Filter elements are included.

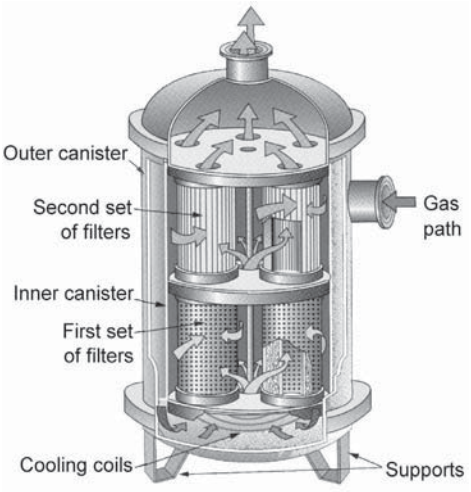
MULTI-TRAP (Multi-Stage High Performance Vacuum Trap)

The multi-stage high performance MULTI-TRAP protects oil sealed and dry running pumps used within reactive processes (such as TEOS, NITRIDE, HTO, PLASMA). It filters corrosive vapors and during the working processes generated particles which can contaminate the vacuum pump. Thereby, it prolongs the maintenance cycles and reduces the downtime.

The three-stage construction ensures a nearly complete filtration of the through-flow. The first stage traps large, heavy particles, aerosols and liquids on the large housing surface.

The second and the third stages are equipped with filter media enabling the filtration of reactive chemicals and fine particles. A wide range of filter media is available for different fields of application.

Optional cooling stage
In order to achieve higher condensation, there is an optional cooling stage available for the 10“ models (MV-355040; MV-355050) and the 12“ models (MV-355080; MV-355100). The cooling stage is to be mounted to the first stage of the MULTI-TRAP and can be operated with different cooling systems (water, POLYCOLD). The gas flow is restraint-guided through the cooling stage before reaching the second stage with the filter media. This ensures a higher deposition rate of liquids and condensable gases.



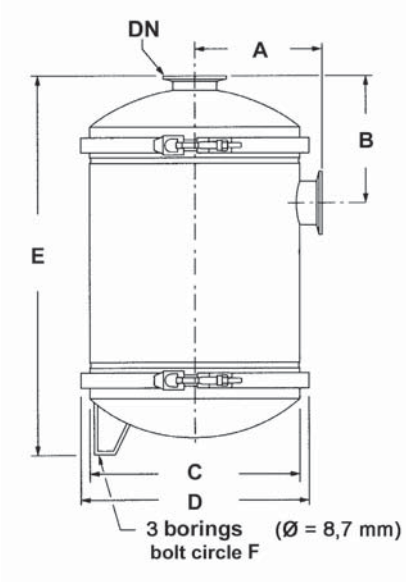
The arrows show the distribution of the process gases.

Constructions
Five standard models in three sizes are available:
- The models MV-355040 and MV-355050 have two stages with five parallel filter elements per stage
- The models MV-355080 and MV-3550100 have two stages with six parallel filter elements per stage
- The model MV-355160 has two stages with eight parallel filter elements
- The filter elements are not included and can be ordered according to your requirements

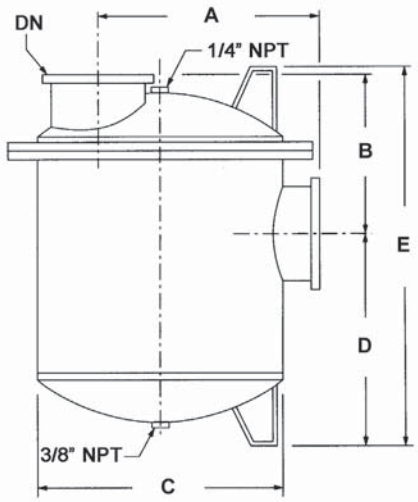
MULTI-TRAP (Multi-Stage High Performance Vacuum Trap)

Technical data

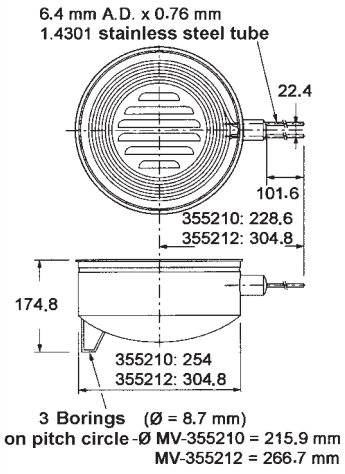
Order code	Flange	Description	Housing material	Housing seal
MV-355040	**DN40KF**	MULTI-TRAP 10" model 2 x 5 filter elements (4.5") are required	stainless steel	Buna N O-rings
MV-355050	**DN50KF**			
MV-355210	**-**	cooling module for MV-355040 and MV-355050	**-**	
MV-355080	**DN80ISO-K**	MULTI-TRAP 12" model 2 x 6 filter elements (4.5") are required	stainless steel	Buna N O-rings
MV-355100	**DN100ISO-K**			
MV-355212	**-**	cooling module for MV 355080 and MV 355100	**-**	
MV-350160	**DN160ISO-K**	MULTI-TRAP 16" version 2 x 8 filter elements (4.5") are required	stainless steel	Buna N O-rings



10" - 12" version



16" version



Cooling coil

Order code	Flange	A	B	C	D	E
MV-355040	DN40KF	152.4	152.4	254	271.8	457.2
MV-355050	DN50KF	152.4	152.4	254	271.8	457.2
MV-355210	-	22.4	101.6	228.6	254	174.8
MV-355080	DN80ISO-K	190.5	190.5	304.8	322.6	469.9
MV-355100	DN100ISO-K	190.5	190.5	304.8	322.6	469.9
MV-355212	-	22.4	101.6	304.8	304.8	174.8
MV-350160	DN160ISO-K	355.6	254	406.4	355.6	622.3

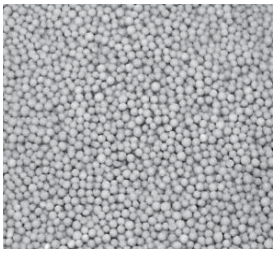
Filter Media for Vacuum Traps

Filter Elements (Cartridges for All Traps)

The filter elements are equipped with stainless steel end caps and Buna N seal rings for a long lifetime and durability. The large selection of filter elements and possible combinations enable a wide range of applications. Customized filter elements can be delivered on request.
The filter elements are replaceable and available in two sizes of the following materials:

Order code 4.5" version	Order code 9.5" version	Material	Application
MV-300905	**MV-300900**	copper gauze	large surface absorbs condensate, particles and oil vapor
MV-300915	**MV-300910**	stainless steel gauze	such as copper gauze, with corrosion protection
MV-300925	**MV-300920**	molecular sieve	reduces back-streaming of oil and vapor
MV-300935	**MV-300930**	Sodasorb®	filters corrosion particles, chemicals and neutralizes acid vapors
MV-300945	**MV-300940**	activated charcoal filter	filters organic vapors
MV-400915	**MV-400910**	aluminium oxide	filters acids, polar compounds, water and particles
MV-400925	**MV-400920**	PolyPro 2 µm	filters particles up to Ø 2 µm
MV-400935	**MV-400930**	PolyPro 5 µm	filters particles up to Ø 5 µm
MV-400945	**MV-400940**	PolyPro 20 µm	filters particles up to Ø 20 µm

Zeolite Filling for Adsorption Traps



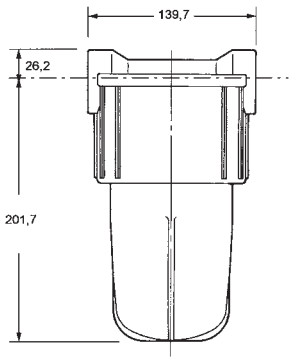
In order to achieve a consistent filtering result and to extend the maintenance rate of the pump, it is necessary to exchange the zeolite after repeated regeneration.

Order code	Mesh size	Quantity [g]
ZEOLITH	10 A	1000

Oil Mist Separators

Oil mist separators are mounted to the exhaust of oil sealed rough pumps to minimize the pollution of the surrounding by filtration of the oil mist emerging from the pump.

OME (Oil Mist Eliminator with Transparent Housing)



The OME oil mist eliminator is equipped with filter elements with low gas resistance and filters oil mist from 0.1 µm at 99.999 %. The filling level of the separated oil can be monitored through the transparent sump without demounting the filter from the vacuum system.

Elbows and other adapters are available on request.

Technical data

■ Sump	plastics
■ Sealing	Buna N ring
■ Filter	replaceable filters of synthetic resin with embedded glass fibers
■ Separation rate for oil mist	99.999 %
■ Connections	3/4" NPT female thread, pump side and for exhaust
■ Weight	1.1 kg

Order code	Description
MV-360500	OME oil mist eliminator with transparent sump, with one filter element
KF25NPT34	DN25KF flange
MV-301075	3/4" NPT male thread
MV-360905	replacement filter element

HCOME (High Capacity Oil Mist Eliminator)

HCOME 4

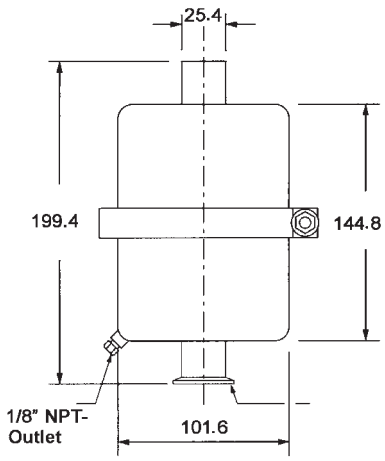
HCOME 8

The high performance oil mist separator HCOME is commonly used for pumps with a pumping speed higher than 40 m^3/h (4") and 70 m^3/h (8"). Replaceable filters of synthetic resin with imbedded glass fibers enable the absorption of the oil mist. Possible fields of application are for example systems with limited space, where the oil mist filter has to be mounted directly on the pump's exhaust. In addition, the separator can be used for corrosive processes or applications using acetone.
Furthermore, the HCOME has an oil outlet unit for the oil recirculation and can easily be disassembled and cleaned for maintenance purposes.

Two models are available:
- The 4" model has space for one filter element and can be used for pumps with a connecting nozzle to DN40KF.
- The 8" model has space for three filter elements and can be used for pumps with a connecting nozzle to DN50KF.

In general, the diameter of the HCOME connection should be at least half as big as the size of the pump's inlet port.

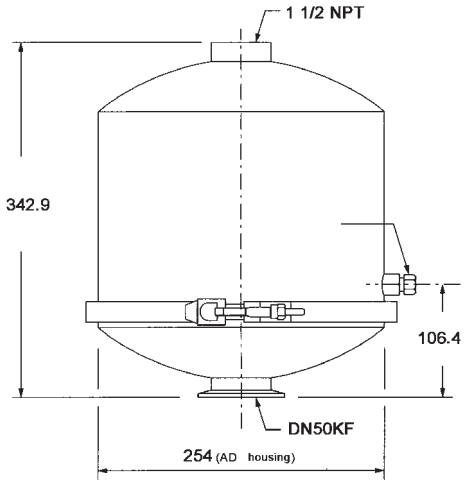
Technical data	4" Model	8" Model
Sump	stainless steel	
Filter	replaceable filter of synthetic resin with embedded glass fibers	
Number of filters	1	3
Separation rate for oil mist	99.999 %	
Pump size	40 m^3/h	70 m^3/h
Connections pump side exhaust	DN25KF flange 1" hose termination	DN40KF flange, 1.5" hose termination
Weight [kg]	1.4	4.5



Order code	Model	A	B	C	D	DN
MV-360300	4"	144.8	101.6	199.4	25.4	DN25KF
MV-360200	8"	194.6	203.2	252.7	38.1	DN40KF

Order code		Description
4" Version	**8" Version**	
MV-360300	**MV-360200**	HCOME (high capacity oil mist filters), number of filter elements: MV-360300 = 1 MV-360200 = 3
KF25NPT34	**KF40NPT34**	KF flange adapters (DN25 or DN40 on NPT3/4" male thread
KF25C	**KF40C**	KF clamp ring, DN25KF or DN40KF
KF25SVCR	**KF40SVCR**	KF centring ring, DN25KF or DN40KF, staninless steel / FKM
EL25K	**EL40K**	KF elbow 90°, DN25 or DN40, stainless steel
KF25VR	**KF40VR**	replacement O-rings
MV-360915		replacement filter element

Maxi-HCOME (Ultra High Capacity Oil Mist Eliminator)



The ultra high performance oil mist separator MAXI-HCOME can be used for pumps with a pumping speed to 500 m^3/h. Equipped with five filter elements of synthetic resin, it achieves also on big pumps an oil mist separation rate of 99.999 %.
Furthermore, the MAXI-HCOME has an oil outlet unit for the oil recirculation and can easily be disassembled and cleaned for maintenance purposes due to its quick fastener.

Technical data

■ Sump material	stainless steel
■ Connections	DN50KF on pump side, 1.5" NPT thread on exhaust side
■ Filter	five parallel replaceable filters of synthetic resin with embedded glass fibers (pore size 0.1 µm)
■ Diameter	254 mm
■ Total height	343 mm
■ Weight	6.8 kg

Order code	Description
MV-360000	incl. 5 filters and drain valve
KF50C	KF clamp ring DN50
KF50SVCR	KF centring ring, stainless steel/FKM, DN50
EL50K	KF elbow 90°, DN50
MV-360915	replacement filter element
KF50VR	replacement O-ring, DN50
MV-371018	replacement drain valve