HYDAC INTERNATIONAL

OffLine Filter
OLF 15/30/45/60

Operating and Maintenance Instructions

English (translation of original instructions)

Document no.: 3101179g

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All details are subject to technical modifications.

Technical specifications are subject to change without notice.

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Preface

We have compiled the most important instructions for the **operation** and **maintenance** of our product for you, its user, in this documentation**.**

It will acquaint you with the product and assist you in using it as intended in an optimal manner.

Keep it in the vicinity of the product so it is always available.

Sometimes the information contained in the documentation cannot always keep up with changes made to the product as we attach considerable importance to keeping our products cutting-edge. Consequently, there might be deviations in technical details, illustrations and dimensions.

If you discover errors while reading the documentation or have suggestions or other useful information, please don't hesitate to contact us:

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The editorial board would welcome your contributions.

"Putting experience into practice"

Technical Support

Contact our technical sales department if you have any questions on our product. When contacting us, always include the model/type designation, serial no. and part-no. of the product:

Fax: ++49 (0) 6897 / 509 - 846

E-mail: filtersystems@hydac.com

Product modification

We would like to point out that changes to the product (e.g. purchasing additional options, etc.) may mean that the information in the operating instructions is no longer applicable or adequate.

After modification or repair work that affects the safety of the product has been carried out on components, the product may not be returned to operation until it has been checked and released by a HYDAC technician.

Report any modifications carried out on the product by you or a third party immediately.

Warranty

For the warranty provided by us, please refer to the General Terms of Sale and Delivery of HYDAC FILTER SYSTEMS GMBH.

Refer to these at www.hydac.com ⇨ General terms and conditions.

Using the documentation

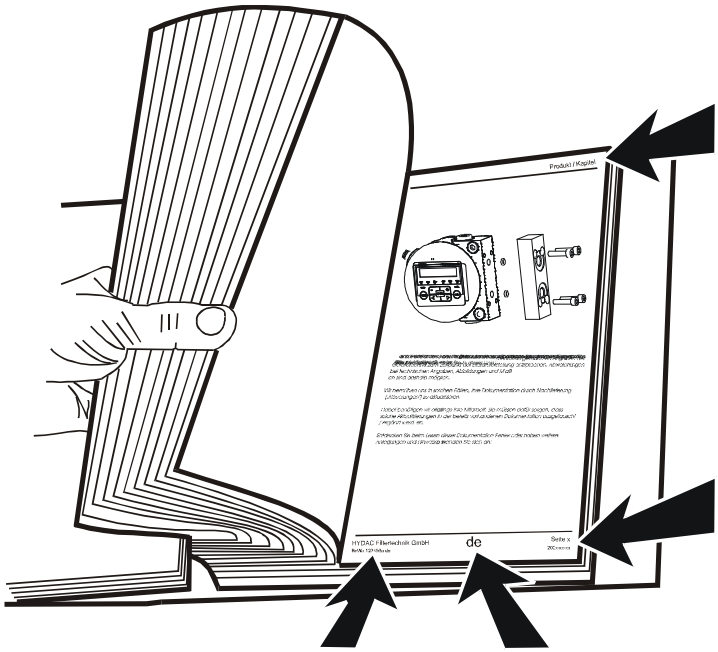
Note that the method described for locating specific information does not release you from your responsibility of carefully reading these instructions prior to starting the unit up for the first time and at regular intervals in the future.

WHAT do I want to know?

I determine which topic I am looking for.

WHERE can I find the information I'm looking for?

The documentation has a table of contents at the beginning. There, I select the chapter I'm looking for and the corresponding page number.



The documentation number with its index enables you to order another copy of the operating and maintenance instructions.
The index is incremented every time the manual is revised or changed.

Safety Information and Instructions

These operating instructions contain the most important information for operating the OffLine Filter unit in a proper, safe manner.

Obligations and Liability

The basic prerequisite for the safe and proper handling and operation of the OLF is knowledge of the safety instructions and warnings.

These operating instructions in general, and the safety precautions in particular, are to be adhered by all those who work with the OLF.

Adherence is to be maintained to pertinent accident prevention regulations applicable at the site where the product is used.

The safety precautions listed herein are limited solely to using the OLF.

The OLF has been designed and constructed in accordance with the current state of the art and recognized safety regulations. Nevertheless, hazard may be posed to the life and limb of the individual using the product or to third parties.

The OLF is to be used as follows:

- solely for its designated use
- only when in a safe, perfect condition

Immediately remedy any malfunctions that might impair safety.

Our General Terms and Conditions apply. They are made available to the owner upon concluding purchase of the unit at the latest. Any and all warranty and liability claims for personal injuries and damage to property shall be excluded in the event they are attributable to one or more of the following causes:

- improper use of the OLF or use deviating from its designated use
- improper assembly, installation, commissioning, operation and maintenance of the OLF
- operating the OLF when the system equipment or systems are defective
- modifications to the OLF made by the user or purchaser
- Improper monitoring of unit components that are subject to wear and tear
- Improperly performed repair work

Explanation of Symbols and Warnings, etc.

The following designations and symbols are used in this manual to designate hazards, etc.:

DANGER denotes situations which can lead to death if safety precautions are not observed.

WARNING denotes situations which can lead to death if safety precautions are not observed.

CAUTION denotes situations which can lead to severe injuries if safety precautions are not observed.

NOTICE denotes situations which can lead to property damage if safety precautions are not observed.

Proper/Designated Use

The OLF Compact is a stationary filter unit used for filtering hydraulic or lubricating oils.

Any other use shall be deemed to be improper and not in keeping with the product's designated use.

The manufacturer will not assume any liability for any damage resulting from such use.

Proper or designated use of the product extends to the following:

- Maintaining adherence to all the instructions contained herein.
- Performing requisite inspection and maintenance work.

Improper Use

Any use deviating from the proper/designated use described above is prohibited.

Improper use may result in hazard to life and limb.

Informal Safety Precautions

Make sure to always keep the operating instructions in the vicinity of the unit.

Apart from the operating instructions, any and all general and local regulations pertaining to accident prevention and environmental protection are to be made available and observance to be maintained to them.

Make sure to keep the safety and hazard symbols and warnings on the product in a legible condition.

The hoses and connection fittings are to be checked daily for leakage (visual check). The electrical components of the OLF are to also be regularly checked (visual check once a month). Any loose connections or damaged cables are to be replaced immediately.

Training and Instruction of Personnel

The OLF may only be operated by properly trained and instructed personnel.

The areas of responsibility of your staff must be established in a clear-cut manner.

Staff undergoing training may not use the OLF unless supervised by an experienced staff member.

Activity / Individuals	Individuals undergoing training	Individuals with technical training/ engineering background	Electrician	Supervisor with the appropriate authority
Packing / transportation	X	X		X
Commissioning		X	X	X
Operation	X	X	X	X
Troubleshooting/ locating the source of malfunction		X	X	X
Remedying of mechanical faults		X		X
Remedying of electrical faults			X	X
Maintenance	X	X	X	X
Servicing				X
Decommissioning/storage	X	X	X	X

Safety Measures to Be Followed during Normal Operation

Do not operate the OLF unless all the safety devices function properly.

The product is to be checked once a day for external damage and the proper functioning of the safety devices.

Hazards Posed by Stored Residual Energy

Note that the unit may pose a hazard as the result of possible residual stored mechanical and electrical energy. Take the proper precautions when instructing personnel on the use of the unit. Detailed information is provided in the respective chapters of this manual.

WARNING

Hydraulic systems are under pressure

Danger of bodily injury

► The hydraulic system must be depressurized before performing any work

Electrical Hazards

DANGER

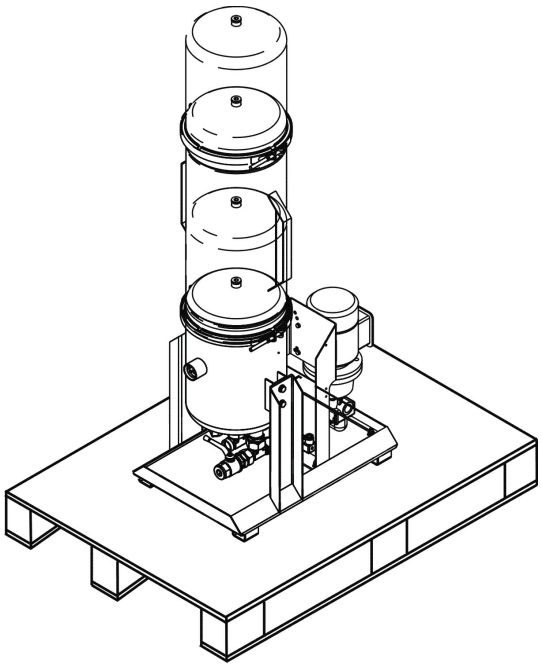
Electric shock

Danger of fatal injury

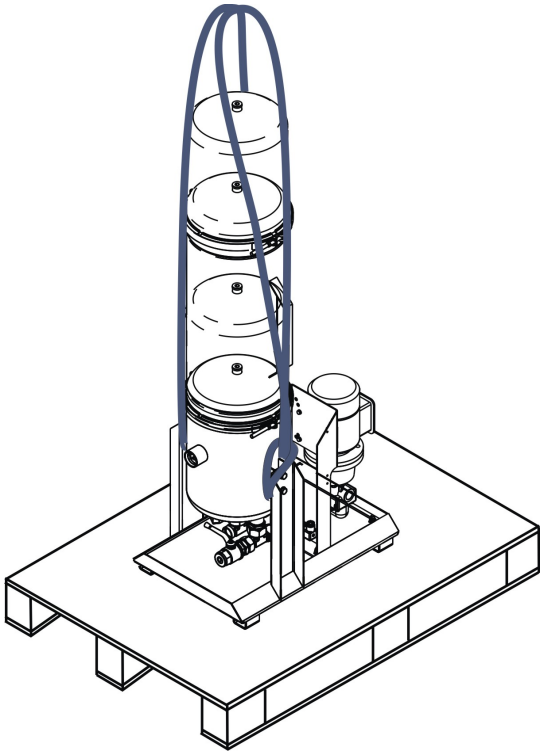
► Any work involving electrical equipment may only be done by a properly trained, certified electrician.

Transporting the OLF

Transport the OLF in an upright position only.



For transportation using a crane or forklift, use two slings on the specified anchor points between the filter housing and the base.

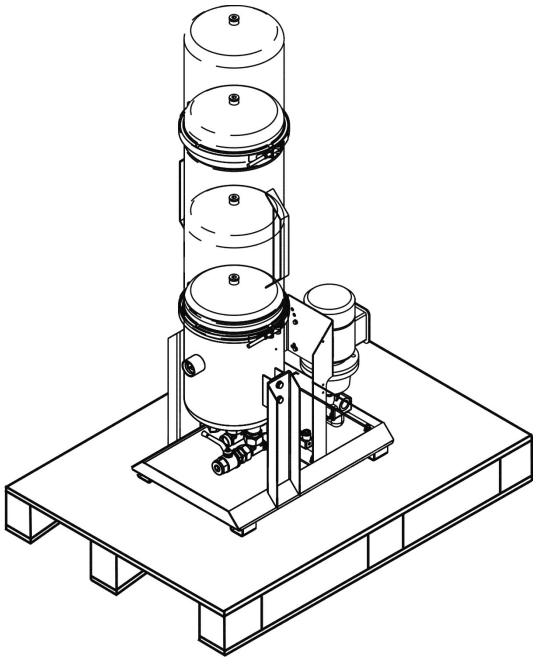


Storing the OLF

Completely drain the OLF and remove all filter elements before putting into storage.

Storage temperature:	5 … 30°C / 41 … 86°F
Humidity:	Up to 80% relative humidity non-condensing
Air	Clean, salt-free air, not near oxidizing substances (rust film).
Storage duration	Indefinite. Before the unit is started up again after being stored for more than two years, all seals must be replaced.

Store the OLF in an upright position only.

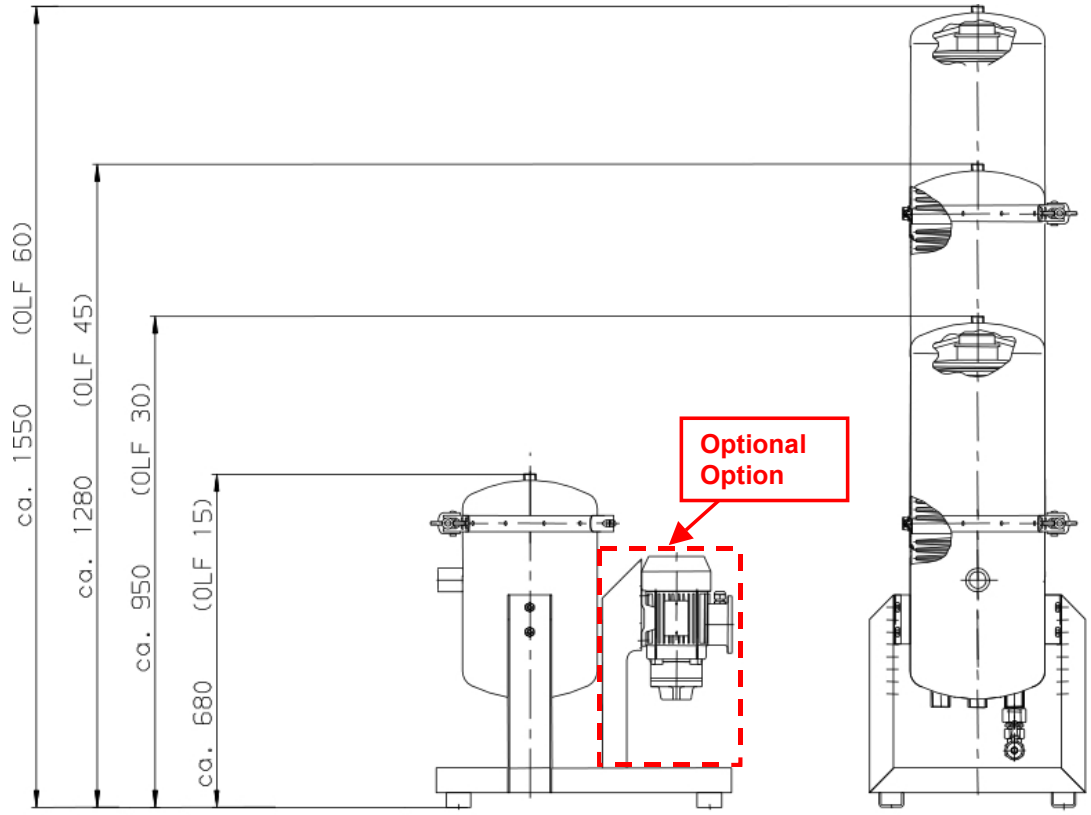


Checking the scope of delivery

Upon receiving the OLF check it for any damage in transit. Do not put the OLF into operation unless it is in perfect condition. Any damage in transit is to be reported to the forwarding agent or the department in charge immediately; the unit may not be commissioned until this damage is properly remedied.

The following items are supplied:

Item	Qty.	Description
1	1	OffLine Filter 15/30/45/60 (type of elements and with or without pump according to order)
-	1	Operation and Maintenance Instructions (this document)



Description

The filters of the OLF 15/30/45/60 series are sturdy filters for stationary applications in hydraulic and lubrication systems with large volumes of fluid.

Features of the DIMICRON® filter elements used in these filters are their particularly high contamination retention capacity and an environmentally safe method of disposal (incinerable).

OLF with pump (optional)

The OLF is produced as standard in the 4 filter sizes 15/30/45/60, with different types of pumps for different viscosities.

Pump types	Viscosity
Centrifugal pump	1 … 20 mm²/s
Vane pump	15 … 500 mm²/s
Gear pump	15 …1000 mm²/s
Without pump	-

Restrictions Pertaining

WARNING

Fire hazard

Danger of bodily injury

► With the OLF, you may filter / pump only media / fluids with a flash point ≥ 56°C / 133°F

NOTICE

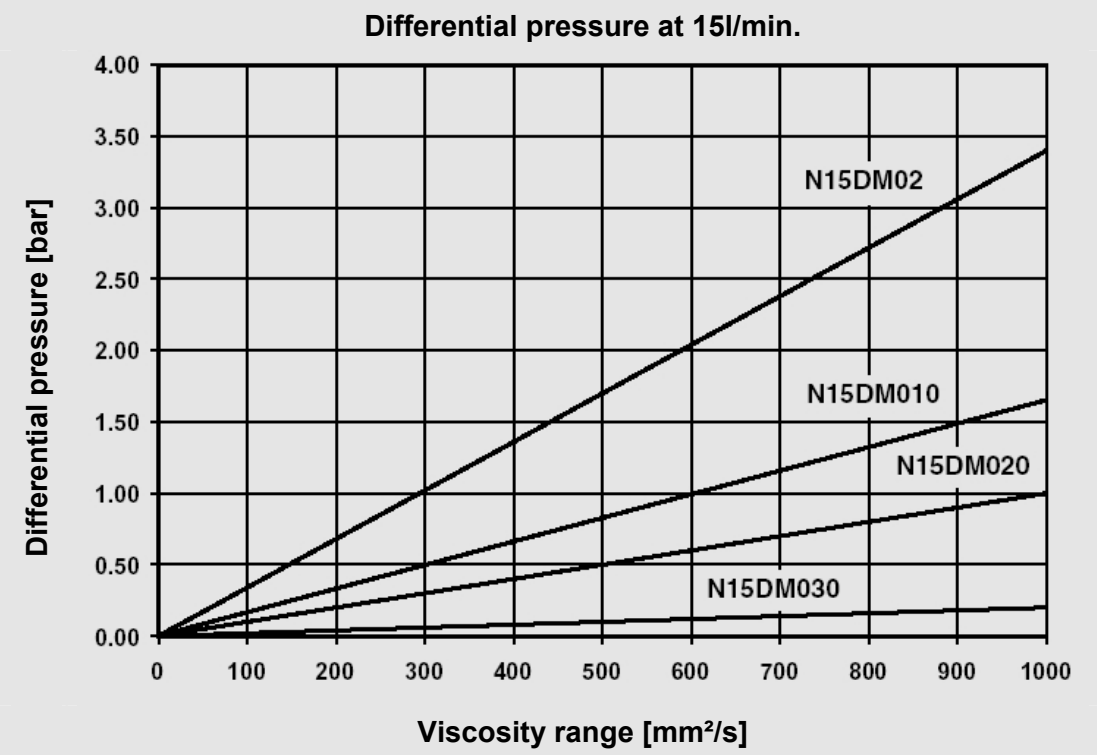
Unpermitted operating media

The filtration unit will be destroyed.

► The OLF is only to be used with mineral oils or mineral oil-based raffinates.

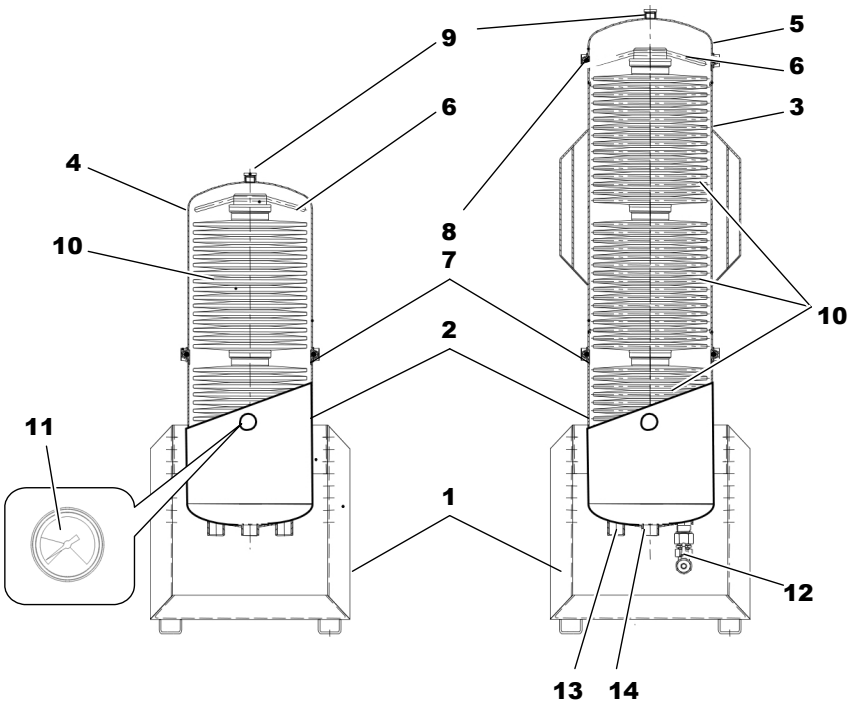
► Do not filter any caustic or explosive media.

Element differential pressure



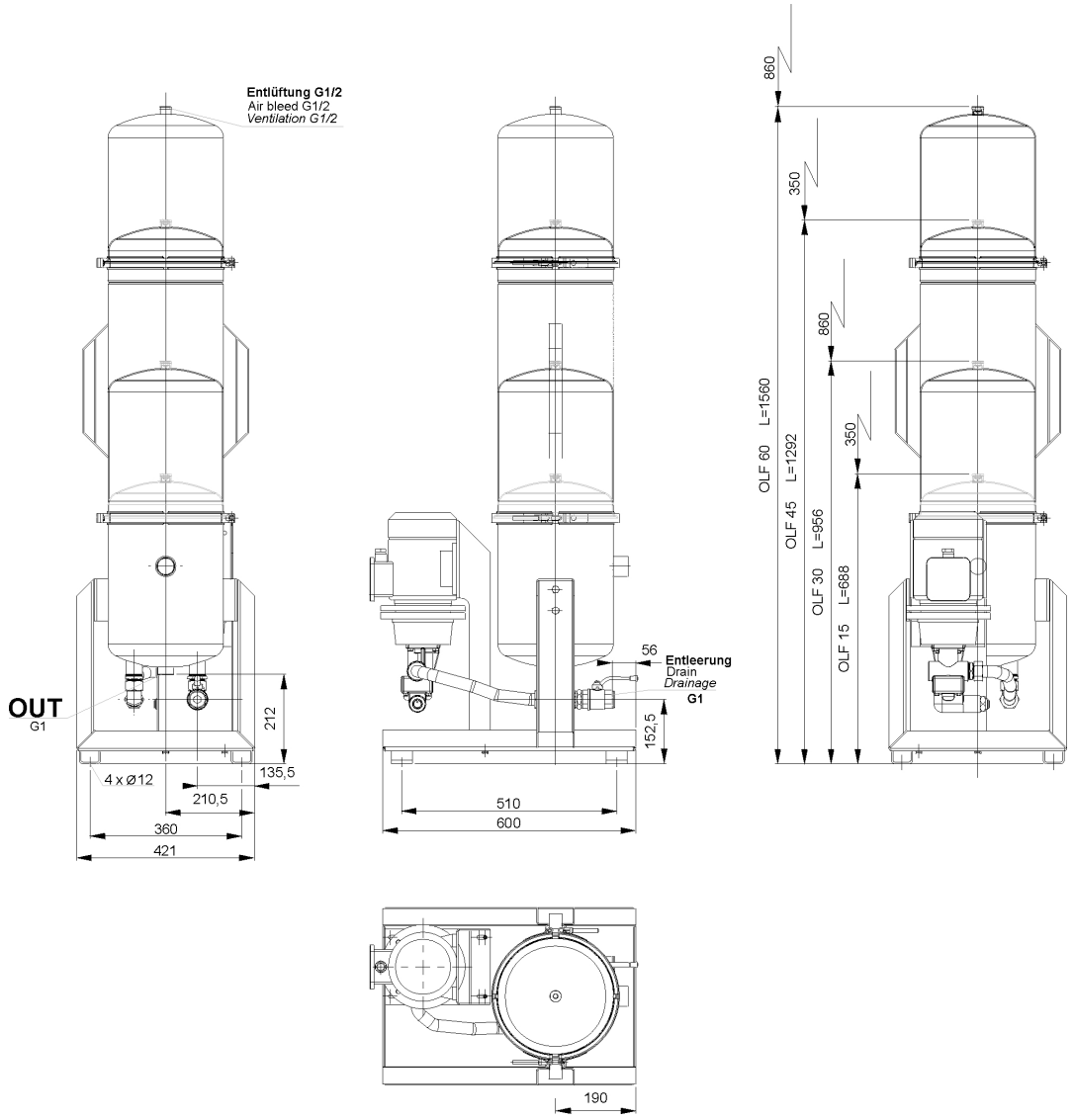
The pressure loss through the filter housing is negligible.

OLF Design



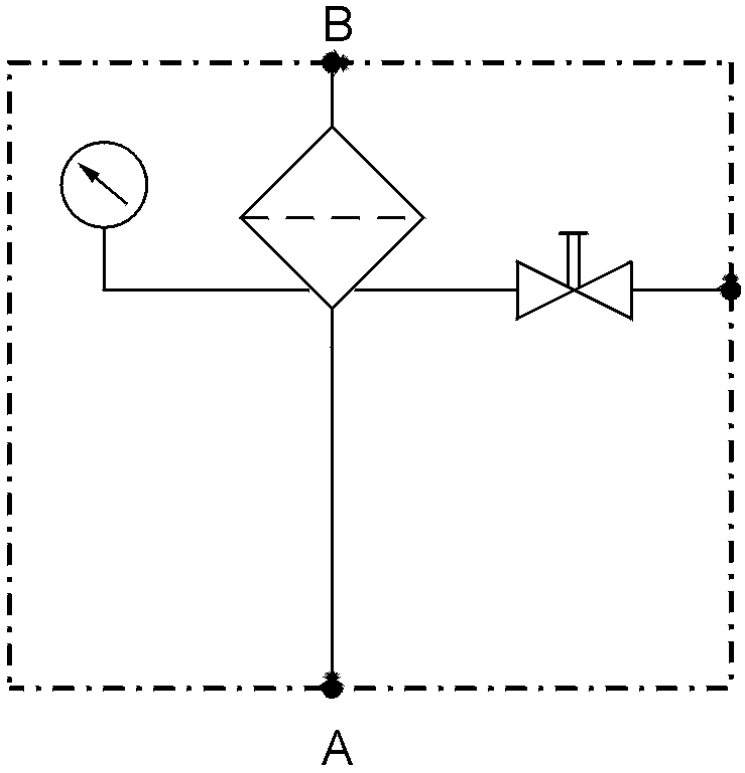
Item	Description
1	Foot
2	Lower section
3	Intermediate piece (only with filter size 45 / 60)
4	Cover, high (only with filter size 30 / 60)
5	Cover, flat (only with filter size 15 / 45)
6	Element locking cap
7	Tensioning clamp for housing
8	O-ring for housing
9	Air bleed screw
10	Filter element
11	Filter clogging indicator (dynamic pressure gauge)
12	Drain fitting G1
13	INLET G1“ (dirtiness side)
14	OUTLET G1“ (clean side)

Dimensions

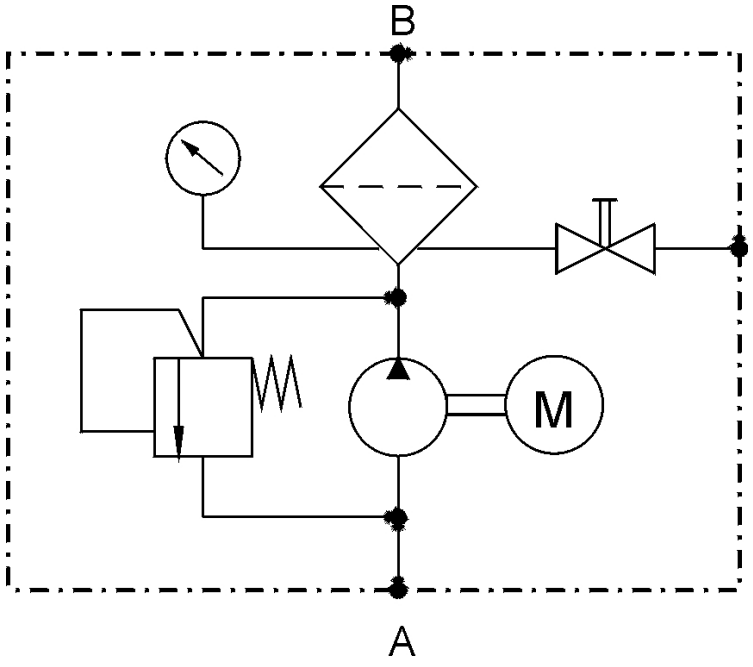

Entlüftung G1/2
Air bleed G1/2
Ventilation G1/2
OUT
G1
212
135,5
4 x Ø12
210,5
360
421
56
Entleerung
Drain
Drainage
G1
152,5
510
600
190
860
350
860
350
OLF 60 L=1560
OLF 45 L=1292
OLF 30 L=956
OLF 15 L=688

Hydraulic diagram

OLF (filter only)

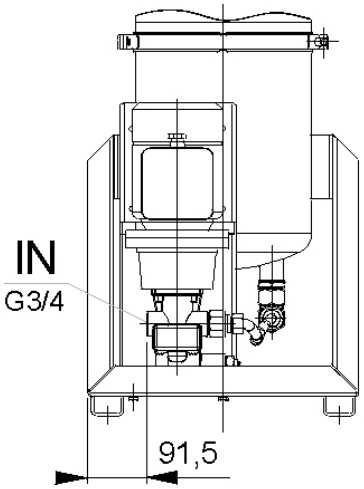


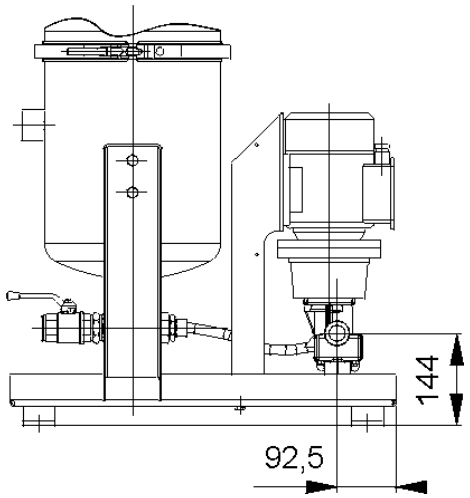
OLF with pump and motor



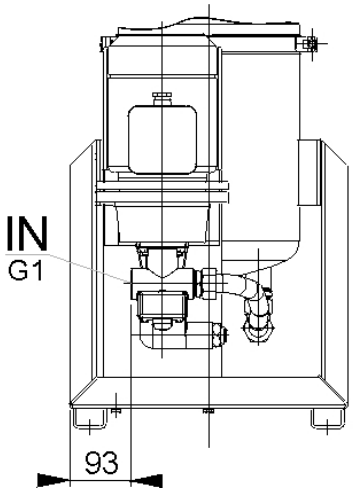
Connections for type with gear pump (OLF-G- ……)

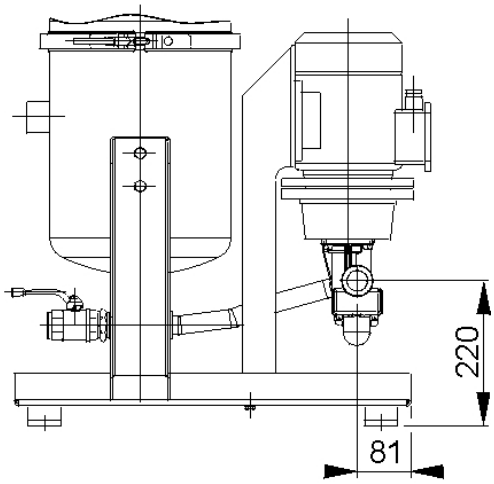
Flow rate: 15 l/min



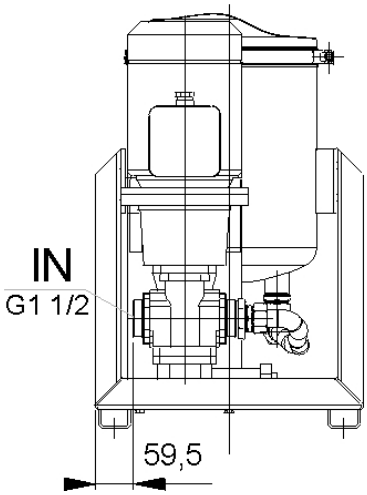


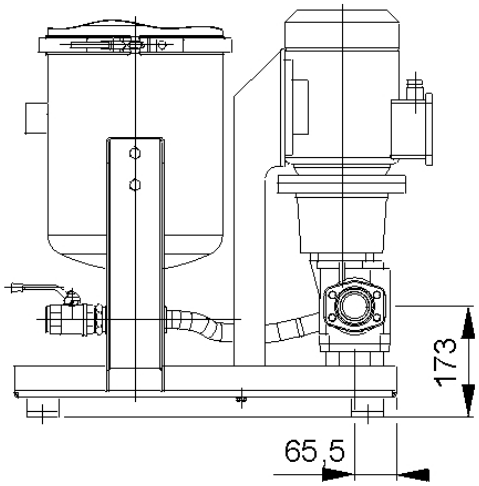
Flow rate: 30 l/min





Flow rate: 45 to 60 l/min





OLF set up

To set up the OLF, proceed as follows:

1. Set up the OLF horizontally on a level surface.
2. Make sure that there is sufficient space above the filter housing to replacing the filter elements.
3. Observe the maximum permissible ambient temperature and constant supply of cooling air for OLFs which have a pump to avoid overheating.
4. In the case of installation below the fluid level, Install shut-off valves in the feed and return lines.

Notes on Piping / Hosing

Make sure that no vibrations or stress/loading from other machinery and equipment are carried over to filter housing. If necessary, use expansion joints.

The pressure loss in a hydraulic line depends upon:

- Flow rate
- kinematics viscosity
- pipe dimensions
- fluid density

The pressure loss can be estimated for hydraulic oils as follows:

$$\Delta p \approx 6.8 * L / d^4 * Q * V * D$$

Δp	=	Pressure differential in [bar]	
L	=	Line length [m]	
d	=	Internal line diameter [mm]	
Q	=	Flow rate [l/min]	
V	=	Kinematic viscosity [mm²/s]	
D	=	Density [kg/dm³]	Mineral oil-based hydraulic fluid has a density of ≈ 0.9 kg/dm³.

This applies to straight pipelines and hydraulic oils. Additional threaded connections and pipe bends increase the pressure differential.

Keep the height difference between the pump and the oil level in the tank as low as possible.

Constrictions in the connections and lines should be avoided. This could compromise suction output and cause cavitation .

Take note that the nominal size of the connected hoses/piping must be at least as large as the inlet port sizes.

Make sure that no vibrations or stress/loading from other machinery and equipment are carried over to filtration unit. Use hoses or expansion joints if necessary.

Connecting the suction port (only for version with pump)

For the suction port connection, use a flexible hose that is resistant to negative pressure. Avoid constrictions in the connections and lines, as they compromise suction output and increase the risk of cavitation.

In case of coarse contamination (> 100 µm) such as weld splatter, an appropriate suction strainer must be installed in the suction line in order to protect the pump.

If a unit without a motor-pump assembly is used, it is important to ensure that no pressure pulsation is transmitted to the filter housing.

NOTICE

Overpressure at the suction port connection

The filter unit will be damaged

► The maximum pressure on the suction port connection IN must not be more than -0.4 to 0.6 bar.

Connecting the pressure port

Make sure that the nominal width of the pressure line corresponds to the connector thread of the filter housing.

Install the return line below the oil level to prevent air from entering the fluid in the tank

If the clogging indicator pressure displayed for the a clean filter element is > 1 bar, use a differential pressure clogging indicator.

Electrical Connection of the OLF

DANGER

Electric shock

Danger of fatal injury

► Any work involving electrical equipment may only be done by a properly trained, certified electrician.

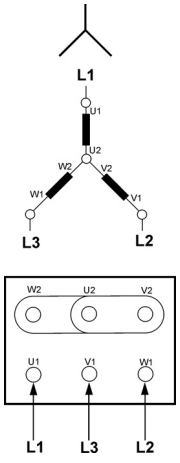
Check or compare the local mains voltage and frequency specifications with the specifications on the type label of the unit.

The pump motor must be protected from overloading, in accordance with VDE 0113 or local regulations, respectively.

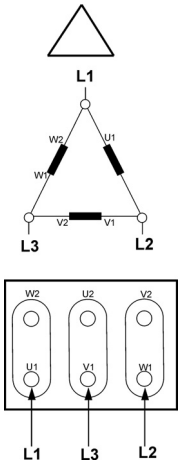
Switch the pump on and off briefly to check the direction of rotation (jog mode). When viewing from the ventilator side, the direction of rotation must be in clockwise direction. Commutate two phases if the direction of rotation is incorrect.

Depending on the voltage supply, the motor has to have a Y or delta connection (see type label on the motor).

Star (Y-) connection



Delta connection



Starting up the OLF

6 bar maximum

87 psi maximum

WARNING

Hydraulic system is under pressure

Danger of bodily injury

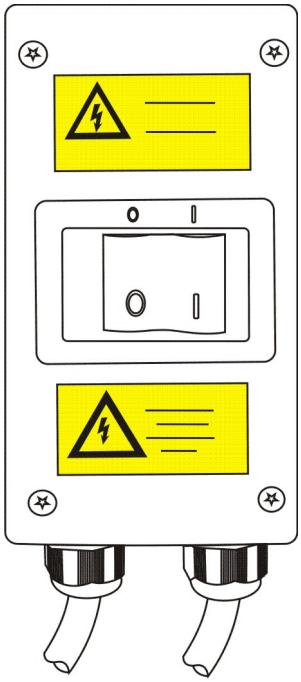
- ► Note the maximum operating pressure
- ► The hydraulic system must be depressurized before performing any work on the hydraulic system
- ► Vent the filter housing

Before commissioning, open the filter housing and check that the filter elements are firmly in place and that the locking cap is installed, or insert the filter elements if necessary. You can find details about changing the filter elements on page 26.

Put the OLF into operation only after all preparations for commissioning are complete.

Switch on pump (only for option: /-PKZ)

If the OLF is equipped with a pump and an on / off switch, switch the pump on or off at the on / off switch. The on / off switch has a motor protection switch.



Performing Maintenance

WARNING

Hydraulic systems are under pressure

Danger of bodily injury

► The hydraulic system must be depressurized before performing any work on the hydraulic system

The OLF is standard-equipped with a dynamic pressure gauge. This displays the pressure from the filter element.

Replace the filter elements immediately when the back pressure > 2.5 bar or when the indicator is in the red range.

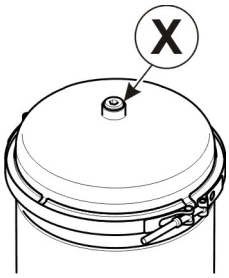
Optionally, the OLF can also be supplied with electrical differential pressure gauges.

Changing the Filter Element

To change the filter elements, proceed as follows:

1. If a pump is present, switch it off and make sure it cannot be inadvertently switched back on.

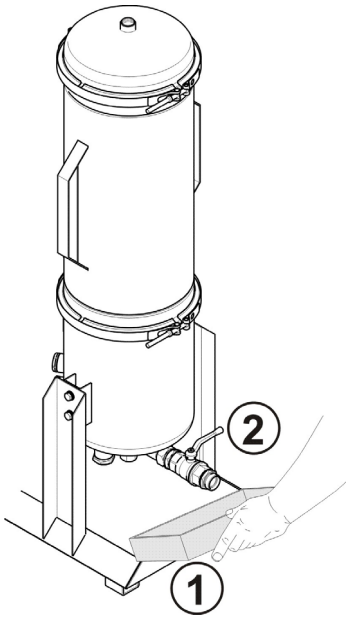
2. Close all shut-off valves at the inlet and outlet.
3. Unscrew the air bleed screw (x) completely using a 10 mm Allen wrench.



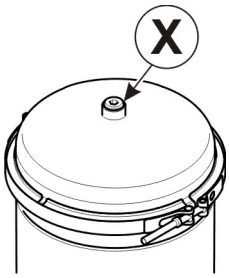
4. (1) Have a suitable drip tray at hand to catch the fluid.

   (2) Open the drain fitting and collect the escaping fluid in the tray.

   Once the housing has been completely drained, closed the drain fitting.



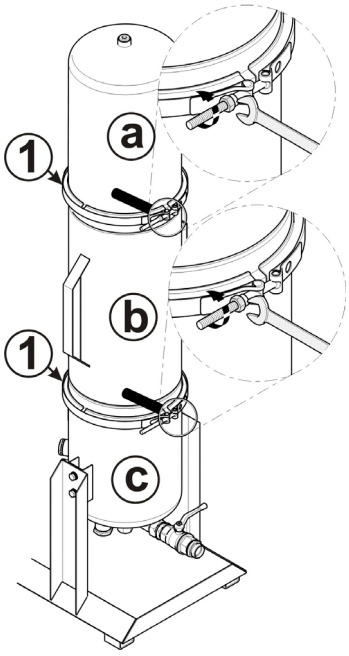
3. Screw in the air bleed screw (x) by hand in a clockwise direction and tighten it firmly using a 10 mm Allen wrench.



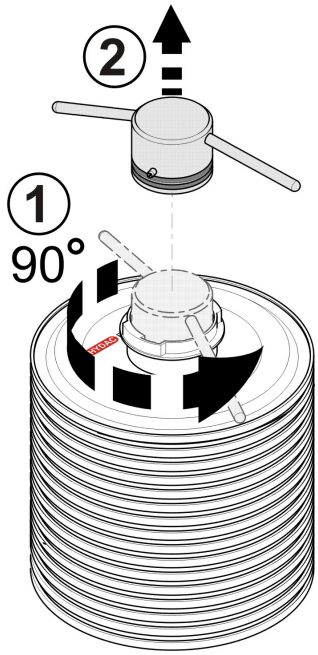
4. Release the housing tensioning clamps (1) and remove them.

   Lift off the cover (a).

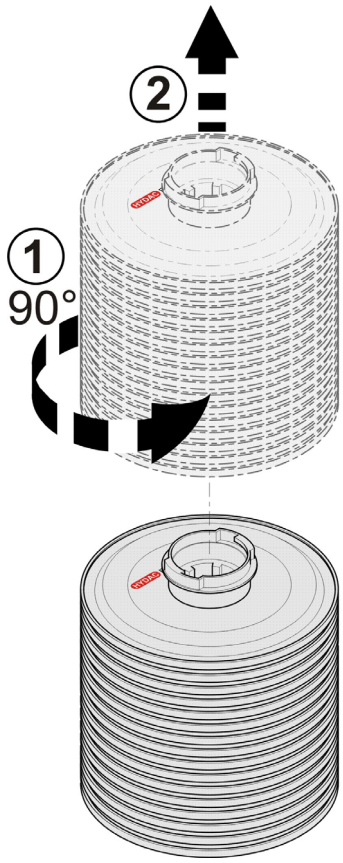
   Lift off the intermediate piece (b).



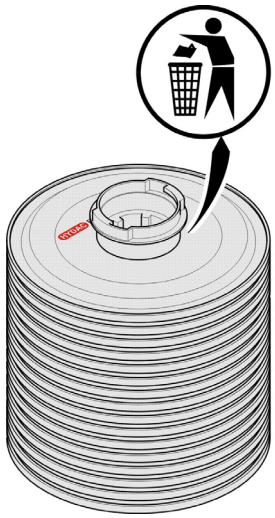
5. Turn the element locking cap on the top filter element by 90° in counterclockwise direction (1) and lift off the locking cap (2).



6. Turn all filter elements by 90° in a counterclockwise direction and lift it off.

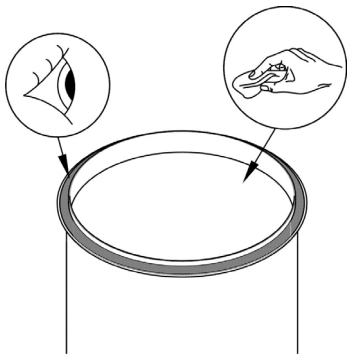


7. When disposing of the old filter elements, observe all local regulations.

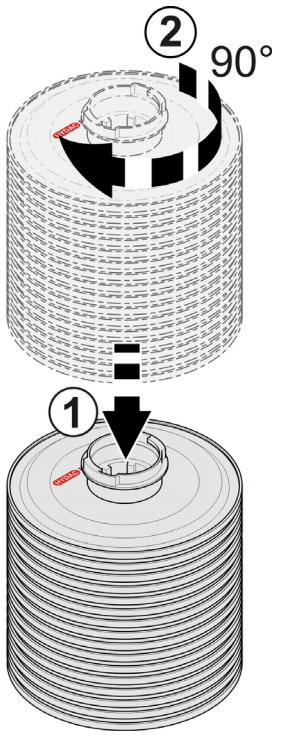


8. Clean the inside of the filter housing of coarse dirt.

   Check the O-rings on the filter housing for damage. If necessary, replace them.

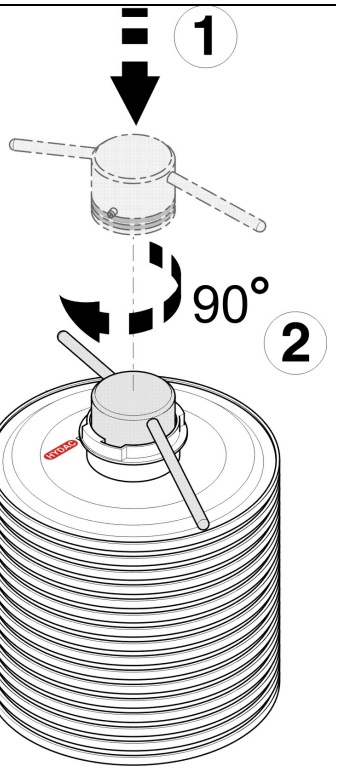


9. Insert the filter element into the bayonet fitting (1) and lock it in place by turning each individual filter element by 90° in a clockwise direction (2).



10. Place the element locking cap on the upper filter element (1).

    Turn the locking cap by 90° in a clockwise direction to lock it in place.



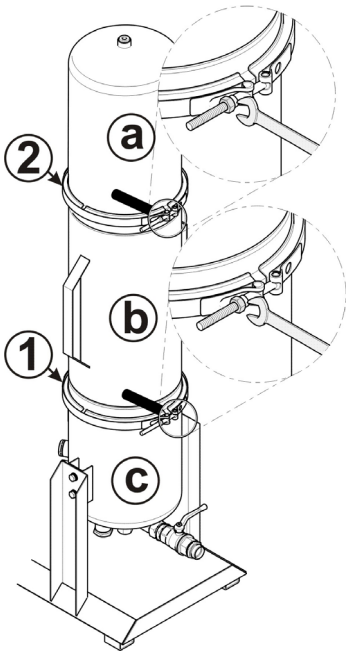
No element locking cap = no filtration.

11. Put the intermediate piece (b) onto the lower section (c).

    Mount the lower housing tensioning clamp (1) and tighten it with a torque of 20 Nm. Secure using the lock nut.

    Put the cover (a) onto the intermediate piece (b).

    Mount the upper housing tensioning clamp (2) and tighten it with a torque of 20 Nm. Secure using the lock nut.



We recommend applying lubricant containing a slip additive to the threads of the housing tensioning clamp each time the filters are changed so that it remains easy to remove.

Lubricant containing a slip additive - HYDAC p/no..: 3066287

12. Open all shut-off valves at the inlet and outlet.

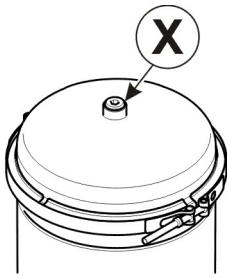
    If a pump is present, switch it on.

13. Fill the filter housing slowly.

    Slightly undo the air bleed screw (x). The air in the filter housing can escape via the slot on the air bleed screw.

    Bleed the filter housing through the air bleed screw (x) until fluid comes out.

    Tighten the air bleed screw.



14. The OLF is ready for operation.

Disposal of OLF

To take the OLF out of operation, proceed as follows:

1. Switch off the OLF at the main switch (only for version with pump).
2. Close all shut-off valves on the OLF.
3. Drain the OLF completely.
4. Remove all of the filter elements.
5. Clean the inside of the housing.
6. Remove all of the hydraulic and electrical connections with the OLF.

Disposing of the OLF

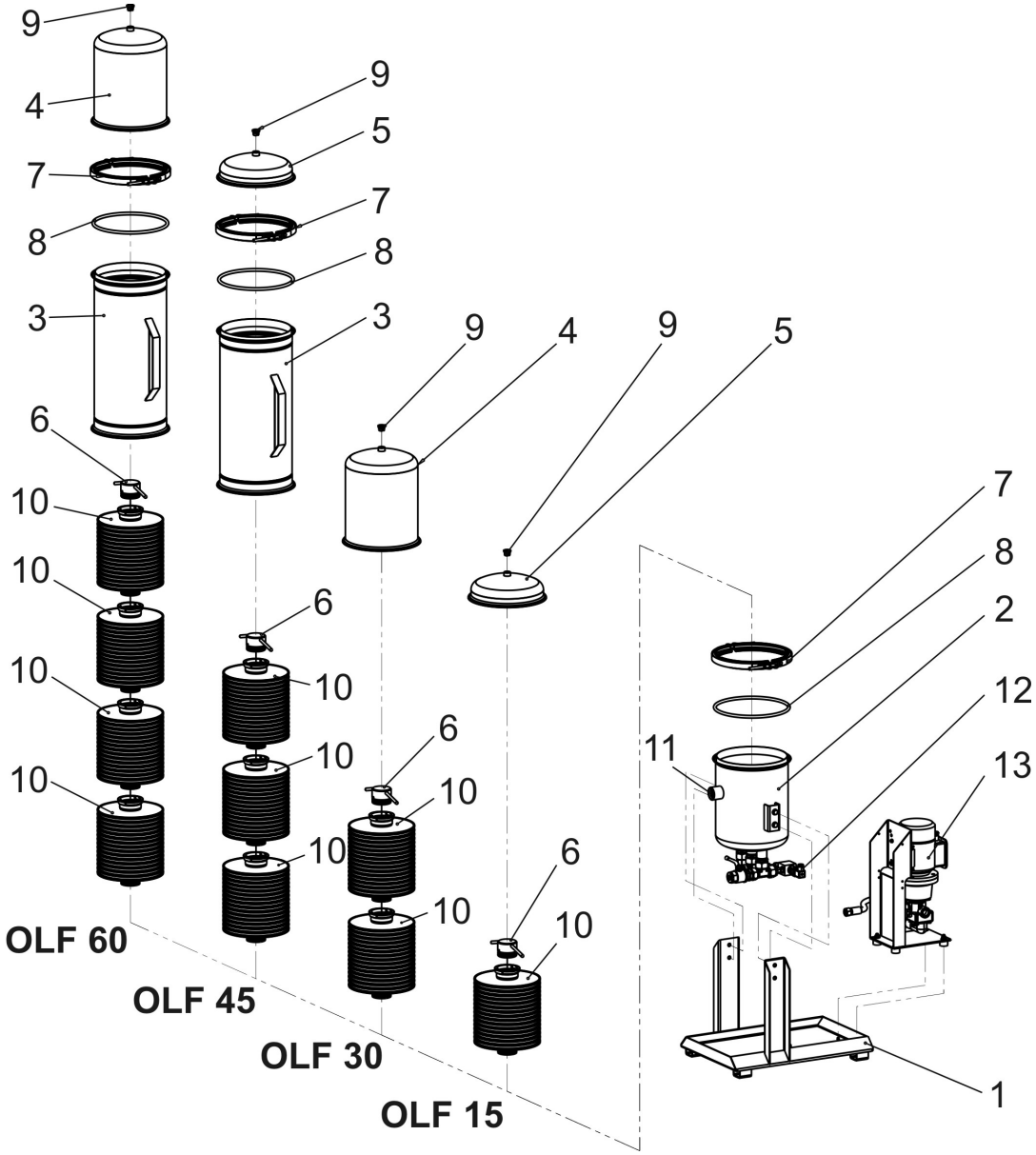
Dispose of the packaging material as appropriate for your area.

When decommissioning and/or disposing, observe all local guidelines and regulations pertaining to occupational safety and environmental protection. This applies in particular to the oil in the unit, to components coated in oil, and to electronic components.

After disassembling the unit and separating the various materials, reuse them or dispose of them properly in accordance with local regulations.

OLF spare parts

Use only original spare parts. Make sure to always indicate the exact unit designation (see type label) and the serial number when ordering spare parts.



Item	Description		Part no.	Qty.			
				15	30	45	60
1	Foot		3030479	1	1	1	1
2	Lower section		3076290	1	1	1	1
3	Extension piece		3030463	-	-	1	1
4	Cover, tall		3030461	-	1	-	1
5	Cover, flat		3030462	1	-	1	-
6	Element locking cap		0349235	1	1	1	1
7	Tensioning clamp for housing	6 bar / 87 psi	6005235	1	1	2	2
8	O-ring for housing	NBR	6005449	1	1	2	2
8	O-ring for housing	FPM	6012630	1	1	2	2
9	Air bleed screw		0403302	1	1	1	1
10	Filter element 2 µm	N15DM002	1251590	1	2	3	4
10	Filter element 5 µm	N15DM005	3252552	1	2	3	4
10	Filter element 10 µm	N15DM010	3115180	1	2	3	4
10	Filter element 20 µm	N15DM020	0349576	1	2	3	4
10	Filter element 30 µm	N15DM030	3048790	1	2	3	4
11	Dynamic pressure gauge		0036198	1	1	1	1
12	Clogging indicator / differential pressure gauge		*	-	-	-	-
13	Pump with motor		*	-	-	-	-

*) available on request

Specifications

OffLine Filter

Specifications	OLF-15	OLF-30	OLF-45	OLF-60
Number of filter elements N15DMxxx	1	2	3	4
Contamination retention capacity to ISO 4572	500 g	1000 g	1500 g	2000 g
Filtration performance data in line with ISO 4572	$\beta_{2,10,20,30} > 1000$ at $\Delta p = 2bar$			
Permissible Δp on the element	5 bar	5 bar	5 bar	5 bar
Weight of the elements	3 kg	6 kg	9 kg	12 kg
Filter housing material	Stainless steel: 1.4301			
Filter housing content	20 l	40 l	60 l	78 l
Operating pressure, maximum	6 bar / 87 psi	6 bar / 87 psi	6 bar / 87 psi	6 bar / 87 psi
Material of sealings	NBR / FPM	NBR / FPM	NBR / FPM	NBR / FPM
Weight (without motor and pump)	~ 25 kg	~ 30 kg	~ 40 kg	~ 45 kg
Permissible operating temperature	10 … 80°C / 50 … 176°F	10 … 80°C / 50 … 176°F	10 … 80°C / 50 … 176°F	10 … 80°C / 50 … 176°F

Pump and motor combinations (optional)

Motor-pump group	15 l/min	30 l/min	45 l/min	60 l/min
Operating pressure of the pumpe in bar	4.5 … 5.5	4.5 … 5.5	4.5 … 5.5	4.5 … 5.5
Viscosity range with Vane pump (mm²/s)	15 … 500	15 … 500	15 … 500	15 … 500
Viscosity range with Gear pump (mm²/s)	15 … 1000	15 … 1000	15 … 1000	15 … 1000
Viscosity range with Centrifugal pump mm²/s	1 … 20	1 … 20	1 … 20	1 … 20
Motor capacity	370 W	750 W	1500 W	1500 W
Weight, vane pump	~ 7.4 kg	~ 13.5 kg	~ 19.5 kg	~ 19.5 kg
Weight, gear pump	~ 9.5 kg	~ 15 kg	~ 22 kg	~ 22 kg
Weight, centrifugal pump	~ 15 kg	~ 15 kg	~ 25 kg	~ 25 kg
Material of seals in pump	NBR	NBR	NBR	NBR
Inlet connection, vane pump	G ¾	G 1¼	G 1¼	G 1¼
Inlet connection, gear pump	G ¾	G 1	G 1½	G 1½
Inlet connection, centrifugal pump	G 1	G1	G 1¼	G 1¼
Permissible operating temperature	-10 … 40°C 14 … 104°F	-10 … 40°C 14 … 104°F	-10 … 40°C 14 … 104°F	-10 … 40°C 14 … 104°F
IP class	IP54	IP54	IP54	IP54

Model Code

OLF - 30/15 - S - N60 - N15DM0020 - E - PKZ-V

Basic Type

OLF = stationary

Filter Size

15/… = 1 Filter element
30/… = 2 Filter element
45/… = 3 Filter element
60/… = 4 Filter element
…/xx = See "Nominal flow rate" table

Pump

S = Vane pump
G = Gear pump
W = Centrifugal pump
z = Without pump

Voltage

B = 480 V, 3 Ph
C = 380 V, 3 Ph
G = 440 V, 3 Ph
L = 115 V, 1 Ph
M = 230 V, 1 Ph*
N = 400 V, 3 Ph
O = 460 V, 3 Ph
P = 575 V, 3 Ph
R = 415V, 3 Ph
S = 500 V, 3 Ph
W = 230 V, 3 Ph
X = Other voltages upon request
L60 = Operation at 60 Hz
M60
z = Without electro motor

Filter element

N15DM002 = DIMICRON® 2 µm absolute
N15DM005 = DIMICRON® 5 µm absolute
N15DM010 = DIMICRON® 10 µm absolute
N15DM020 = DIMICRON® 20 µm absolute
N15DM030 = DIMICRON® 30 µm absolute
z = without filter element

Clogging indicator

E = Standard, back pressure gauge
B = Differential pressure gauge - visual
C = Differential pressure gauge - electrical
D3 = Differential pressure gauge, visual/electrical (VM 2 D.0/-L220)
D4 = Differential pressure gauge, visual/electrical (VM 2 D.0/-24)
D5 = Differential pressure indicator, visual/electrical (VM 2 LZ.1/-DB)
F = Pressure switch, electrical (VR 2 F.0)

Supplementary details

PKZ = with on-off switch and overload protective switch
FA1 = with on-off switch and cut-out when filter clogged incl. option PKZ (clogging indicator C or D3)
FA2 = with on-off switch and cut-out when filter clogged incl. option PKZ (clogging indicator C or D3) without neutral wire
V = Sealing material FPM (Viton)
MP = Measure point for FCU incl. flow control valve

Nominal flow rates

15 l/min	30 l/min	45 l/min	60 l/min
15/**15**	**-**	**-**	**-**
30/**15**	30/**30**	**-**	**-**
45/**15**	45/**30**	60/**45**	**-**
60/**15**	60/**30**	60/**45**	60/**60**

- = not available

Notes

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