FES
Fluid Sampling Set

Operating and Maintenance Instructions

English
(translation of original instructions)

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All details are subject to technical modifications.
Technical specifications are subject to change without notice.

HYDAC Filtertechnik GmbH
Service Technology Division / Filter Systems
P.O. Box 12 51
D-66273 Sulzbach / Saar
Germany

Phone: ++49 (0) 6897 / 509 – 01
Fax: ++49 (0) 6897 / 509 – 846
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Preface

For you, as the owner of a product manufactured by us, we have produced this manual, comprising the most important instructions for its operation and maintenance.

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.

Note that the information on the unit's engineering contained in the documentation was that available at the time of publication. There may be deviations in technical details, figures, and dimensions as a result.

If you discover errors while reading the documentation or have additional comments or suggestions, contact us at:

HYDAC Filtertechnik GmbH
Division Service technology / Filter systems
Technical Documentation Department
Postfach 12 51
66273 Sulzbach/Saar - Germany
Fax: ++49 (0) 6897 509 846
Email: filtersysteme@hydac.com

We look forward to receiving your input.

“Putting experience into practice”
Customer Service

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

Fax: ++49 (0) 6897 509 846
Email: filtersysteme@hydac.com

Modifications to the Product

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 may mean that the information in the operating instructions is no longer applicable or adequate.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.

Please notify us immediately of any modifications made to the product whether by you or a third party.

Warranty

For the warranty provided by us, please refer to the General Terms of Sale and Delivery of HYDAC Filtertechnik GmbH.

They are available at: www.hydac.com ⇒ Legal information.
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 assign the information I require to a subject area.

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

Explanation of Symbols and Warnings

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.

- **NOTE** denotes situations which can lead to property damage if safety precautions are not observed.

Please observe the instructions in this manual

These operating instructions contain the key instructions for properly and safely operating the FES. These operating instructions in general, and the safety guidelines in particular, are to be observed by all those who work with the Fluid Sampling Set. In addition, the accident prevention rules and regulation applicable at the location of use are to be observed.

Responsibility of the owner

The owner of the product shall ensure that the Fluid Sampling Set is operated by individuals who are familiar with the basic safety and accident prevention guidelines and who have been trained to handle the FES.
Hazards Posed by Using the FES

The Fluid Sampling Set FES is made up of individual components which are designed and constructed in accordance with the technical state of the art and recognized safety rules and regulations. Nevertheless, their usage can still endanger the operator or third parties. In addition, the Fluid Sampling Set may be damaged during transport or by improper handling. The Fluid Sampling Set is to be used only as follows:

- for the specified correct usage.
- Only when in safe, perfect condition.

Faults which could affect safety must be rectified immediately.

Proper/Designated Use

The Fluid Sampling Set FES is a combination of units developed to analyze the solid particle contamination of mineral oils. Any use extending beyond or deviating therefrom shall not be considered intended use. HYDAC Filtertechnik GmbH will not assume any liability for any damage resulting from such use.

Informal Safety Precautions

Always keep the operating instructions in the vicinity of the Fluid Sampling Set. In addition to the manual, the general and local regulations concerning accident prevention and protection of the environment should be available and observed. Keep the safety and hazard symbols and warnings on the Fluid Sampling Set in a legible condition.

Modifications on the FES

Do not carry out any alterations, conversions or additions to components of the FES without the written consent of HYDAC Filtertechnik GmbH. All component modifications required the written confirmation of HYDAC Filtertechnik GmbH. Immediately replace components that are not in perfect condition. Use only original spare parts (OEM). When using non-OEM components it cannot be ensured that they have been designed and manufactured so as to comply with loading and safety requirements. (Also see chapter on Maintenance)

Cleaning the FES

Maintain the highest level of cleanliness during all work with the Fluid Sampling Set. Every particle that enters the sample or solvent due to contamination will be isolated on the filter membrane and distort the results. (See chapter 0.)
Checking the scope of delivery

The Fluid Sampling Set FES is supplied in a ready-for-operation condition. Check the individual components for possible damage in transit before putting the FES into operation.

<table>
<thead>
<tr>
<th>Item</th>
<th>Qty</th>
<th>Description</th>
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<tbody>
<tr>
<td>-</td>
<td>1</td>
<td>Hand vacuum pump with manometer</td>
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<td>-</td>
<td>1</td>
<td>Aluminum adapter</td>
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<tr>
<td>-</td>
<td>1</td>
<td>Set of sample flasks (2 pieces)</td>
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<tr>
<td>-</td>
<td>1</td>
<td>Spray bottle with removable nozzle, 500 ml</td>
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<td>-</td>
<td>1</td>
<td>Disposable membrane filter for spray bottle, Packing unit = 2 pieces</td>
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<td>1</td>
<td>Plastic hose, length = 2 m</td>
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<td>1</td>
<td>Telescope pen, length: 0.9 m</td>
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<td>-</td>
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<td>Cable strip, 20 pcs.</td>
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<td>Dynamic sampling device</td>
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<td>1</td>
<td>Minimess hose (screw - screw)</td>
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<td>-</td>
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<td>Minimess hose (screw - plug)</td>
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<td>Wide mouth bottle, 500 ml</td>
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<td>Case</td>
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<td>1</td>
<td>Contamination handbook</td>
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</table>
Fluid Sampling Set properties

Compliance with and regular monitoring of the particle load in fluid and lubrication technology is essential for efficient, economical system use.

Static and dynamic sampling for later fluid analysis can be carried out using very simple means with the Fluid Sampling Set FES.

NOTE

- The FluidAnalysis Set may only be used with mineral oils. Contact us prior to using with other operating fluids.

Source of oil contamination

Contamination of hydraulic media is classified according to the particular physical state:

- Solid
- Gaseous
- and liquid contamination.

Solid particles enter the hydraulic system because the unit is inadequately sealed, through maintenance work or new oil, for example. Once present, these particles produce new ones, leading to a "chain reaction of wear".

Gaseous contamination often results from leakage on the suction side of hydraulic pumps, poor return flow of the medium to the tank or when pipelines must be opened (e.g. for maintenance work).

Hydraulic media water contamination can either be caused by condensation or penetration. The condensation of water is caused by temperature differences in the hydraulic reservoir. Water can enter through faulty cooler hoses, faulty seals or a leaky reservoir. Water-absorbent filter elements (filter fineness 3 ... 40 µm) can also be used for the removal of free water.
Oil contaminations influence the ageing of the oil

Solid particles

In addition to the enormous damage to hydraulic components from wear caused by solid particles, the materials of these particles also have an impact on oil aging that cannot be ignored. Reactions with hydrocarbons and additives, which change the properties of the oil (saponification, for example), can occur. On the other hand, metal can act as a catalyst for the oxidation of the hydrocarbon molecules, which reduces the oil's service life considerably. This occurs especially quickly when several contaminants act on the oil at the same time.

Air

Under normal conditions, mineral oils always contain a certain percentage of dissolved air. Unfavourable conditions, e.g. a vacuum, can change the dissolved state of the air. This released air is responsible for the increased compressibility of the medium, a higher tendency to cavitation, and, above all, a drastic acceleration of oil aging.

Water

The aging process of mineral oil accelerates when there is water in the oil, and when there are particles acting as catalysts the process speeds up. The oil additives are used up quickly, and the charge of oil becomes unusable in a fraction of the service life of "dry" oil.
Sampling

NOTE

- The FluidAnalysis Set may only be used with mineral oils. Contact us prior to using with other operating fluids.

Static sampling

This procedure treats the sampling from the reservoir of a system which is not equipped with sampling valves. This procedures should only be applied in situations where no other possibility of sampling (e.g. through the use of nipples) exists. Cut the accompanying plastic hose that is 2 m in length into two parts with the ratio of ≈ 0.5 m / ≈ 1.5 m.

1. Wipe off the outer surface of the reservoir or container near the sampling point and clean the surface with filtered solvent
2. Use the smaller piece of transparent hose (≈ 0.5 m) to connect the aluminium adapter with the manual vacuum pump.
3. Also connect the longer piece of transparent hose with the aluminium adapter.
4. Open the reservoir by removing the reservoir sealing lock or the tank ventilation filter.
5. Place the laboratory bottle for blank sampling up against the aluminium adapter.
6. Guide the longer transparent hose of the manual vacuum pump into the fluid contained in the reservoir up to approximately half the filling height. The transparent hose can also be fastened in place to the telescope pen, which will make handling easier. Make sure during the immersion process that the hose does not come into contact with the side walls or the bottom of the reservoir.
7. Actuate the manual vacuum pump and fill the laboratory bottle for "blank sampling". This is important in order to make sure the hoses, aluminium adapter and manual vacuum pump are flushed.
8. Replace the bottle with the "blank sample" with one of the two clean laboratory bottles provided.
9. Now actuate the manual vacuum pump and fill the bottle until the 250 ml level is reached.
10. Now close the sample bottle carefully and label it as described under Chapter 0.

Dynamic sampling
This method involves the taking of bottle samples of hydraulic fluid from operating fluid power systems via sampling valves provided for that purpose. The sampling should be representative of the operating condition of the hydraulic system. Therefore, the samples should be taken from the same point in the system each time, to enable comparisons to be made. Furthermore, it is important that significant operational demands must be made on the system during the period that the sample is being taken.

1. The dynamic sampler (sampling valve) should always be protected with a cap when it is not in use.
2. The sampling valve (e.g. nipple) and the surrounding parts must be carefully cleaned.
3. Take one of the two sample bottles provided. Make sure that there is no possibility of contamination in the area of the sealing lock. Undo the seal on the sample bottle, but do not remove it. Set the sample bottle down in easy reach.
4. Remove the protective cap from the sampling valve (e.g. nipple) and allow an amount of fluid that is at least twice the volumetric size of the sampling line to drain out into a container. This is necessary in order to rinse out the sampling system. A rinsing volume of 0.5 litres of operating fluid has proven to be sufficient in everyday practice.
5. Take a container and guide it into the stream of fluid without interrupting it. Replace the container with the sample bottle without interrupting the stream of fluid. Remove a sufficient amount of sample (at least 150 ml) for the subsequent analysis. Carefully seal the sample bottle at once.
6. Replace the sample bottles once again with the container and close the sampling valve. Put the sealing cap back on the sampling valve.
7. Label the sample as describe under Chapter 0
Labelling samples

The bottle sample should be labelled with the following information:
- Sample number
- Machine type
- Sampling method
- Date and time of the sampling
- Fluid type

Performing maintenance

The Fluid Sampling Set FES is a combination of laboratory-quality components. Therefore, thorough cleaning of the equipment after every usage is essential for ensuring the quality of the analysis result of the oil samples. For rinsing the laboratory bottles, we recommend N-heptane, which should be decanted into the accompanying spray bottle with membrane filter for this purpose.

Disposing of the FES

When decommissioning and/or disposing of the FES, adhere to local guidelines and regulations pertaining to occupational safety and environmental protection. This applies in particular to cleaning agents, solutions and oil samples which are stored together with Fluid Sampling Set FES.

After disassembling the unit and separating the various materials, they can be reused or disposed of properly in accordance with local regulations.
## Spare Parts List

<table>
<thead>
<tr>
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<th>Qty</th>
<th>Article designation</th>
<th>Part no.</th>
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<td>Disposable membrane filter for spray bottle, Packing unit = 2 pieces</td>
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