

This manual is effective for all standard and customized filters of the series:

- HDD
- HDNL
- HDN
- MDD
- EHD
- Filter battery BHDD 901-1351
- Filter battery BHDNL 401

The manual contains certain requirements and instructions which ensure an unobjectionable operation of the filter. If necessary, it can be complemented by additional, specific instructions of the operator.
The pressure filters listed above are intended for filtration of liquid media.

1. Safety instructions

- Prior to operations at the filter, the manual and the maintenance instructions have to be read carefully.
- The instructions in this manual have to be followed anyway. If operations are carried out differently, the safety of the pressure equipment cannot be assured!
- The operation conditions have to comply with the conditions given in the corresponding filter data sheet, especially the herein specified pressure and temperature range. Attention should also be paid to the compatibility between the filter components and the used operation fluid. Noncompliance can lead to damages at the pressure retaining filter parts and sealing.
- In operation state the filter housing is pressurized. Do not try to loose or remove any part of the filter housing, otherwise operation fluid can leak under high pressure and high temperature conditions and could cause injuries and scalds!
- Depending on the operation temperature, direct contact to filter parts during operation can cause incinerations.
- Do not open the filter housing before it is depressurized!
- Pay attention while replacing the filter element, it might has operation temperature. Risk of burn!
- Always wear safety equipment (safety goggles and gloves), while working on the filter housing.
- In case of contact with the operation fluid, please follow the instructions in the safety data sheet of the fluid manufacturer.
- Use original spare parts only!

The manufacturer does not assume liability for any damage, which occurs due to disregarding of these instructions!

For filter applications in explosive environments, please additionally follow the instructions of Eaton-Doc.No.: 41269...

2. Installation

The filter is supplied ready for installation. It has to be fitted preferably tensionless on a flat and vertical surface, in the position as shown on its corresponding data sheet.

For connecting the filter to the piping system, attention has to be paid that

- no dirt, no debris or fluids reach the inlet of the filter
- the flow direction (IN -> OUT) is held
- the connection pipes are fitted tensionless
- the dismantling dimension and the accessibility of the service elements is guaranteed

Filters with electrical respectively electronic clogging indicators have to be installed according to the unit specific conditions and the technical parameters of the corresponding data sheets.

3. Commissioning

Before commissioning the completeness of the filter (filter elements and seals) and the cleanness have to be controlled. Air bleeding of the controlled filter has to be carried out according to the following instructions:

- The positioning pin of the selector shaft has to be located in the middle position
- If screw fittings are present, connect a high pressure hose of type M16 to the outlets III and IV (V and VI for MDD, HDN, HDD 61-151) according to data sheet 1650, or connect a suitable air-bleed line to the G ¼ thread of the outlets III and IV (V and VI for MDD, HDN, HDD 61-151) after removing the sealing screws
- Connection of the unit volume flow (reduced volume flow; from 10 to 50 l/min) until bubble-free operating fluid flows out of both air bleeding tubes
- Disconnection of the unit volume flow
- Remove the air bleeding tubes and close the air-bleed bore holes or air-bleed connections (air-bleed connections according to data sheet 1651)
- Connection to the required filter side at the positioning pin of the selector shaft

The positioning pin of the selector shaft shows always in direction to the operating filter side.

The air bleeding has to be done parallel at all filters in the case of paralleling filters.

4. Change of Element

The changing of the filter elements is necessary when reaching the unit specific pressure difference respectively reaching the maximum pressure difference given by the clogging indicator. If should is no unit specific definition, the change of the elements should be done at a maximum of $\Delta p = 6$ bar.

This has to be carried out as follows:

- Opening of the pressure balance valve
- Switching over the positioning pin from the operating side to the other side
- Closing the pressure balance valve
- At the serviced filter side the connection III or IV (V or VI for MDD, HDN, HDD 61-151) has to be opened by connecting a high pressure tube M16 according to data sheet 1650 or should be connected to a suitable air-bleed line if no screw fittings are present. A vessel should be held ready to catch the emerging fluid.
- Should an air-bleed screw be present on the filter housing, or on the closing cap of the filter tube, open this and let out the system fluid
- Unscrew the filter housing or closing cap of the filter tube
- Remove the filter elements
- Clean the filter housing or closing cap of the filter tube
- Replace the new or the cleaned filter elements
- Screw the filter housing or filter tube closing cap back on and tighten it. (Torque = 70 Nm for NG 30, 80 Nm for NG 40-150 and NG 61-161, 120 Nm for NG 170-450 and NG 171-451, 140 Nm for NG 601-1351)
- Close up any outlets
- Air bleeding of the serviced filter side (see item 5)

Now, the serviced filter side is ready for operation.

In general take care of the absolute cleanness during the changing of elements. No dirt respectively no impurities should penetrate the filter. The new elements should be taken out of their packing shortly before they are replaced in the filter housings because of mechanical damage.

During the changing of the elements control the availability and quality of the seals. Damaged seals have to be replaced by new ones.

As a matter of principle the elements in filter batteries have to be changed in all operating filters in a single operation. In the first instance all single filter have to be changed over to the opposite side. The next steps are the same as above.

For stainless steel filters it is recommended to grease all threads with metal sliding grease before reassembly them.

5. Airbleeding of the Filter

The air bleeding of the filter during the change of elements is different to the air bleeding of commissioning. there is a air bleeding only at the filter side to be maintained. The air bleeding is done during the operation of the unit.

- Open outlet III or IV (V or VI for MDD, HDN, HDD 61-151) of the non-operational filter being serviced by connecting it to a high pressure hose of type M16, or any other suitable line
 - Open the pressure release valve until bubble-free fluid emerges from the high pressure hose, or attached line
- Repeat the procedure for filters HDD 601-1351, HDNL 401 and their corresponding filter banks, since these filters must be bled of air on the dirt side (outlet III) as well as on the clean side (outlet IV)
- After removing the air-bleed line close the pressure release valve

The serviced filter side is now air-bleeded and is ready for operation without air inside the unit.

In the case of paralleling filters the air bleeding has to be done as described above in on step for the whole filters.

6. Cleaning of the Filter Element

Filter elements with filter materials such as glass fibre (VG) or paper (P) are not cleanable. They have to be replaced after the dirt retention capacity has been reached. Filter elements with filter material such as wire mesh (G) are cleanable and could be used again. The cleaning of the filter elements has to be done according to the cleaning specification for Eaton-Filter elements (metal), sheet-no. 21070-4 and 39448-4.

7. Pressure Difference Measuring

In case of filters installed with clogging indicators a permanent measuring of the pressure difference takes place. The indication corresponds to the kind of clogging indicators; either visual or visual-electrical respectively electronic.

Additionally the connections III and IV could be installed on the selector shaft to be used for external pressure gauges.

At paralleling filters there are additional measuring connections „IN“ and „OUT“ at the connecting block for measuring the pressure difference of the whole paralleling filters.

8. Service

The service will be performed by

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Special questions about the operation of the filter will also be answered within this area.

Spare parts respectively wearing parts have to be ordered according to the spare part list of the filter-data-sheet.