Rexroth
Bosch Group

Off-line filter system

30 NFF2, 50 NFF2, 80 NFF2

RE 51433-B/04.10
Replaces: -.-
English

Operating instructions

The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

The cover page shows an example configuration. The product supplied may therefore differ from the photo shown.

The original operating instructions were prepared in German.

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Contents

1 About this document

These instructions contain important information on the safe and appropriate assembly, transport, commissioning, operation, maintenance, disassembly and simple troubleshooting of the off-line filter system.

- Read these instructions completely, especially chapter "2 General safety instructions" before working with the off-line filter system.

1.1 Related documents

You can find these operating instructions as well as the related documents in the media directory under www.boschrexroth.com/various/utilities/mediadirectory/.

Also observe the generally applicable, legal or otherwise binding regulations of the European or national legislation and the regulations on accident prevention and environmental protection applicable in your country.

1.2 Abbreviations used

Table 1: Abbreviations

Abbreviation	Meaning
NFF2	**Off-line filter system, movable**

2 General safety instructions

The off-line filter system has been manufactured according to the accepted rules of current technology. There is, however, still a risk of personal injury or damage to property if the following general safety instructions and safety instructions before instructions contained in these operating instructions are not observed.

- Read these instructions completely and thoroughly before working with the off-line filter system.
- Keep these instructions in a location where they are accessible to all users at all times.
- Always include the operating instructions when you pass the off-line filter system on to third parties.

2.1 Intended use

The off-line filter system is exclusively intended for the filtration of hydraulic fluids and lubricants with a viscosity of 10 - 200 mm^2/s on the bypass.

- You should observe the performance limits specified in chapter "15 Technical data".

The off-line filter system is technical equipment and not designed for private use.

Intended use includes having read and understood these instructions, especially the chapter "2 General safety instructions".

2.2 Improper use

Any use of the off-line filter system other than described in chapter "2.1 Intended use" is considered as improper.

2.3 Qualification of personnel

Assembly, commissioning and operation, disassembly, service (including maintenance and repair) require basic mechanical, electrical and hydraulic knowledge, as well as knowledge of the appropriate technical terms. In order to ensure operational safety, these activities may only be carried out by corresponding experts or an instructed person under the direction and supervision of an expert.

Experts are those who can recognize potential hazards and apply the appropriate safety measures due to their professional training, knowledge and experience, as well as their understanding of the relevant conditions pertaining to the work to be undertaken. An expert must observe the relevant specific professional rules.

2.4 Safety instructions in this document

In these instructions, there are safety instructions before an instruction whenever there is a risk of personal injury or damage to property. The measures described for preventing these hazards must be observed.

Safety instructions are set out as follows:

SIGNAL WORD! 	**Type of risk!** Consequences ▶ Precautions

- **Warning sign (warning triangle):** Draws attention to the danger
- **Signal word:** Identifies the degree of danger
- **Type of risk:** Specifies the type or source of danger
- **Consequences:** Describes the consequences of non-compliance
- **Precautions:** Specifies how the danger can be prevented

The signal words have the following meaning:

Table 2: Signal words/warning signs

Signal word	Application
DANGER! 	Indicates an **imminently** hazardous situation which, if not avoided, will certainly result in serious injury or even death.
WARNING! 	Indicates a **potentially** hazardous situation, which, if not avoided, could result in serious injury or even death.
CAUTION! 	Indicates a **potentially hazardous** situation which, if not avoided, could result in minor or moderate injury or damage to equipment.
	If this information is disregarded, the operating procedure may be impaired.

2.5 Adhere to the following instructions

2.5.1 General notes

- Observe the regulations on accident prevention and environmental protection for the country where the product is used and at the workplace.
- Rexroth hydraulic systems should be used only if in a sound technical condition.
- Check the product for visible defects, for example cracks in the housing or missing screws and seals.
- Do not modify or retrofit the off-line filter system.
- Only use the product within the performance range provided in the technical data.
- Persons who assemble, operate, disassemble or maintain Rexroth products must not consume any alcohol, drugs or pharmaceuticals that may affect their ability to react.
- The warranty only applies to the delivered configuration. The warranty expires if the product is incorrectly assembled, not used as intended and/or handled improperly.
- Do not expose the product to any mechanical loads under any circumstances. Never use the product as a handle or step. Do not place any objects on top of it.

2.5.2 During assembly

- Make sure the relevant system component is de-pressurized and de-energized before assembling the product or when connecting and disconnecting connectors. Protect the off-line filter system against re-activation.
- Lay the cables and lines so that they cannot be damaged and no one can trip over them.
- Before commissioning, make sure that all the seals and caps of the plug-in connections are installed correctly and undamaged to ensure that fluids and contamination parts are prevented from penetrating the product.
- When assembling, provide for absolute cleanness in order to prevent welding beads or metal chips from getting into the hydraulic lines and causing product wear or malfunctions.

2.5.3 During commissioning

- Let the product acclimate itself for several hours before commissioning, as otherwise water may condense in the housing.
- Make sure that all electrical and hydraulic connections are either used or covered. Commission the product only if it is installed completely.

2.5.4 During operation

- In case of emergency, failure or in case of other irregularities switch off the system and secure it against re-activation.

2.5.5 During cleaning

- Cover all openings with the appropriate protective devices in order to prevent cleaning agents from penetrating the system.
- Never use solvents or aggressive cleaning agents. Only clean the product using a slightly damp, lint-free cloth. Only use water and a mild cleaning agent, if necessary, to do so.
- Do not use a pressure washer for cleaning.

2.5.6 During maintenance and repair

- Perform the prescribed maintenance works at the intervals specified in these operating instructions.
- Make sure that no lines, connections or components are disconnected as long as the system is under pressure and voltage. Protect the system against reactivation.

2.5.7 During disposal

- Dispose of the product in accordance with the currently applicable national regulations in your country.
- Dispose of the hydraulic fluid in accordance with the currently applicable national regulations in your country.
- Dispose of hydraulic fluid residues according to the applicable safety data sheets for hydraulic fluids.

2.6 Obligations of the operator

The operator of the Bosch Rexroth off-line filter system is bound to provide for personnel training on a regular basis regarding the following subjects:

- Observation and use of the operating instructions as well as the legal stipulations
- Intended use of the off-line filter system
- Observation of the instructions from the factory security office as well as the operator’s operating instructions
- What to do in an emergency

2.7 Safety equipment

2.7.1 Personal protective equipment

The operator must provide personal safety equipment (e.g. gloves, safety shoes, safety goggles, overall, etc.).

3 Scope of delivery

The scope of delivery includes:

- 1 off-line filter system 30 (50, 80) NFF2
- 1 suction hose, flexible, 2 m
- 1 pressure hose, flexible, 2 m
- 2 lances, 1 m
- 1 operating instructions for the off-line filter system 30 (50, 80) NFF2

4 Product description

4.1 Performance description

The off-line filter system 30 (50, 80) NFF2 is a mobile filter system for the filtration of hydraulic fluids and lubricants with a viscosity of 10 - 200 mm^2/s on the bypass. Separate installation in the bypass or cooling circuit for the fine filtration and unloading of the main flow filter is just as feasible as the filtration of fresh oil and the cleaning (flushing) of polluted systems for protecting components and system against wear and tear.
The flow amounts to 30 l/min (30 NFF2) or 50 l/min (50 NFF2) or 80 l/min (80 NFF2).
The operating temperature ranges from –10 °C to 60 °C.

4.2 Device description

The 30 (50, 80) NFF2 off-line filter system consists of a one-axis supporting frame to which a filter pump unit has been attached. The 80 NFF2 0270 is an exception; it has been attached to a two-axis frame. The filter pump unit consists of an electrically operated filter pump with exchangeable suction filter and a main filter with electronic maintenance indicator. If the pressure differential exceeds the value of 2.5 bar, the pressure resistance in the suction line is too high. A vacuum meter monitors the pump suction pressure and displays the pressure. The on/off switch is located at a control box. The suction hose is connected at the suction-side port of the protective pump filter and the pressure hose at the main filter output. At their ends, the hoses are in each case equipped with a lance. When they are not used or during transport, they can be fixed in a receiving tube.

4.3 Component overview

(Figure 1 shows 30 NFF2; 50 NFF2 and 80 NFF2 0120 are identical in construction.)

Fig. 1: Device overview 30 NFF2

1 Frame (one-axis)
2 Suction filter (protective pump filter)
3 Vacuum meter
4 Main filter
5 Suction hose
6 Pump power unit
7 Pressure hose
8 Control box

(Figure 2 shows 80 NFF2 0270.)

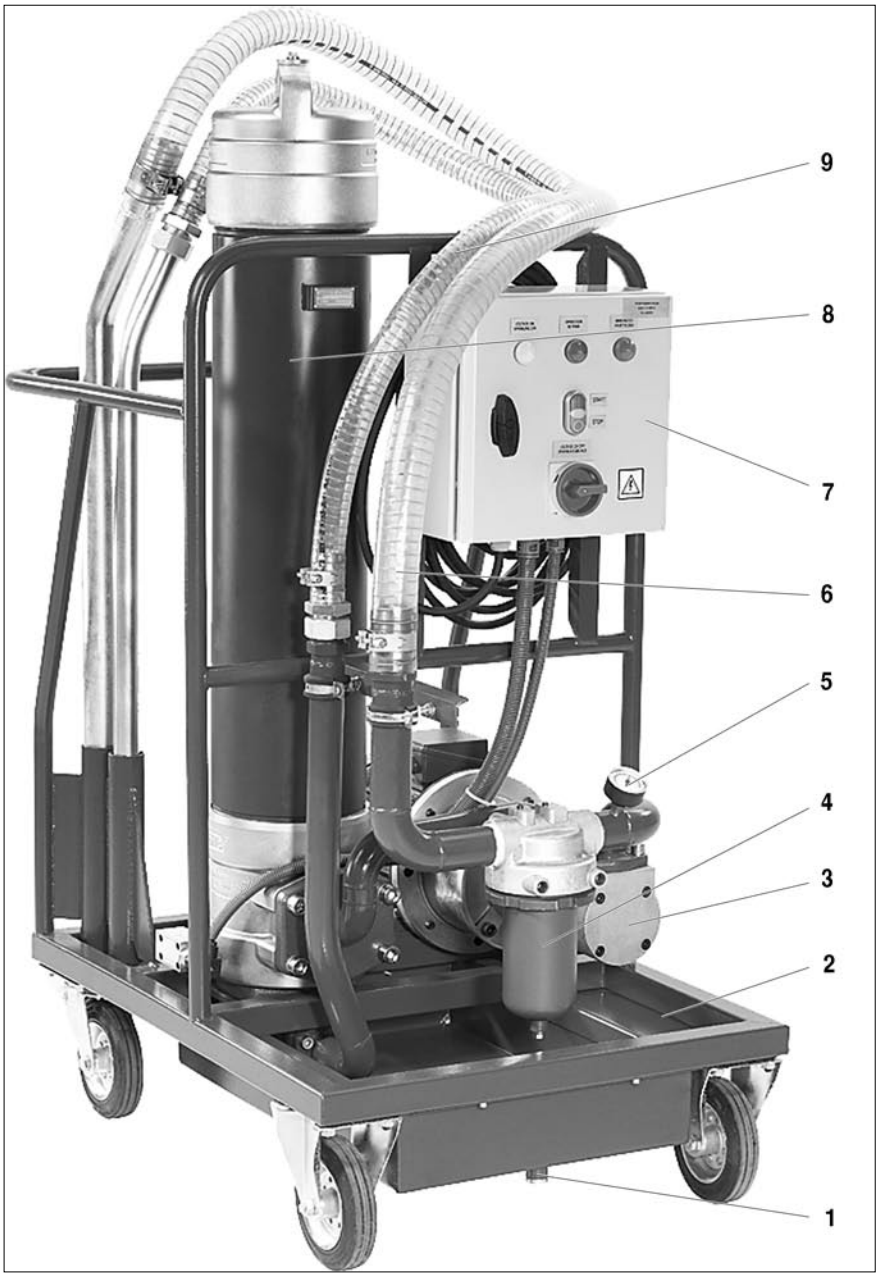


Fig. 2: Device overview 80 NFF2 0270

1 Drain (oil tray)
2 Frame (two-axis)
3 Pump power unit
4 Suction filter (protective pump filter)
5 Vacuum meter
6 Suction hose
7 Control box
8 Main filter
9 Pressure hose

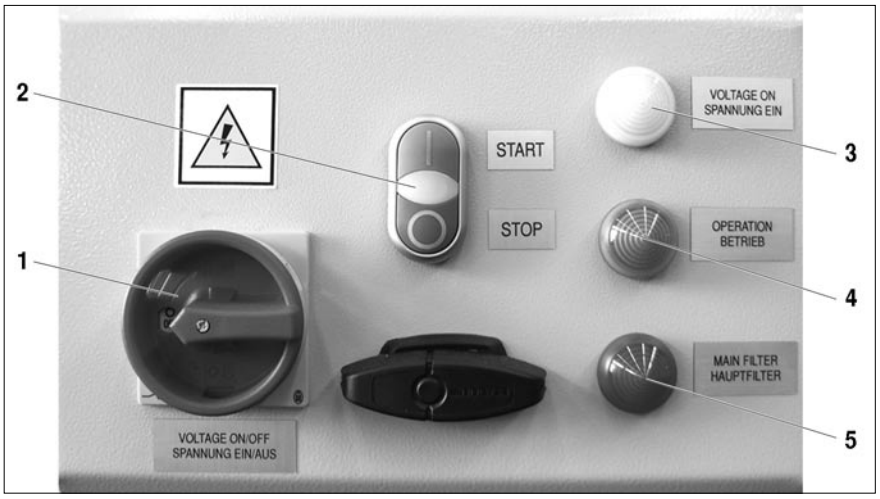


Fig. 3: Control box

1 Main switch
2 START/STOP
3 Display voltage ON
4 Display operation
5 Maintenance indicator main filter

4.4 Product identification

Fig. 4: Name plate

1 Machine number
2 Designation of the machine
3 Designation of the filter element indicating the rating

5 Transport and storage

5.1 Transporting the off-line filter system

The 30 (50, 80) NFF2 off-line filter system must be transported horizontally as there is always a certain amount of oil within the filter unit (in the filter, in the pump as well as in the hoses) that will leak in case of any other transport and lead to pollution.

- Please observe the information in chapter "2 General safety instructions".

5.2 Storing the off-line filter system

The 30 (50, 80) NFF2 off-line filter system should be stored in a closed room in order to protect it against humidity and condensate formation.

DANGER!

Risk of chemical reactions!

Chemical substances in the immediate vicinity of the off-line filter system may react and lead to destruction of the system and injuries of persons staying in the immediate vicinity of the system.

- It is forbidden to store the system in the immediate vicinity of chemically active substances like acids, bases, salts, organic solvents and rechargeable batteries.

The ambient temperature during storage of the 30 (50, 80) NFF2 off-line filter system should lie between +5 °C and +30 °C with an air humidity of maximally 80 %.

Before storage for a period of more than 6 months, the system should be filled with oil in order to preserve it as protection against rust formation.

6 Assembly

6.1 Assembling the off-line filter system

6.1.1 Hydraulically connecting the off-line filter system

- Firstly take the pressure tube lance out of the receiving tube and position it in the container into which the purified oil is to be delivered.
- Make sure that the lance is below the oil level (fig. 5).
- Proceed with the suction tube lance in the same way; put it into the container with the oil to be purified (fig. 5).

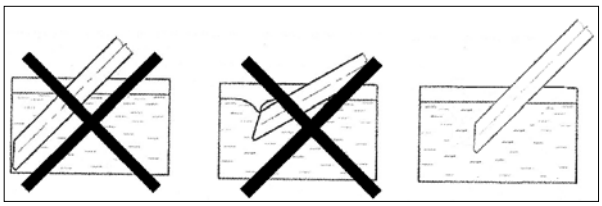


Fig. 5: Lance positions

If the containers have been provided with fittings for connecting the off-line filter system, the lances can also be disassembled and the hoses can be directly attached to the containers using the corresponding fittings.

CAUTION!

Missing seals and caps will lead to non-compliance with protection class IP 54!

Liquids and contamination parts may penetrate and damage the product.

- Ensure before the assembly that all seals and caps of the plug-in connections are tight.

7 Commissioning

CAUTION!

Missing seals and caps will lead to non-compliance with protection class IP 54!

Liquids and contamination parts may penetrate and damage the product.

- Before commissioning, ensure that all seals and plugs of the plug-in connection are leak-proof.

CAUTION!

Product damage!

Polluted hydraulic fluid could result in wear and malfunctions. In particular, contamination parts like e.g. welding beads or metal chips in the suction lines may damage the off-line filter system.

- When commissioning you should ensure absolute cleanliness.

7.1 First commissioning

7.1.1 Activating the hydraulic supply

Proceed as described in chapter "6.1 Assembling the off-line filter system".

7.1.2 Activating the electric supply

Proceed as follows to commission the off-line filter system:

1. Switch on the 400 V AC supply voltage at the control box.

8 Operation

- Make sure that the off-line filter system is not operated unattended.
- Observe the vacuum meter. If the pressure exceeds 2.5 bar, the machine is switched off automatically and a fault is displayed at the control box (fig. 3, item 5). The filter cartridge has to be exchanged (chapter "9.5 Exchanging the filter cartridge").
- The pump must not run dry for more than 30 seconds. Switch off the pump at the on/off switch at the control box.

The vacuum meter monitors the pump's suction pressure. It should be within the range of -0.5 - 0 bar (fig. 6). If the suction pressure falls below –0.5 bar, there is a risk of cavitation.

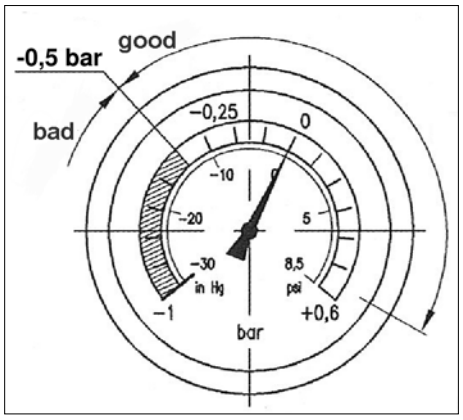


Fig. 6: Vacuum meter

CAUTION!

Risk of cavitation!

Cavitation leads to early pump wear. Symptoms of cavitation include knocking sound in the pump and/or excessive vibrations of the entire unit.

- Remedy the cause for the excessive pressure resistance in the suction line.

- Clear a plugged pipe socket and/or a plugged suction line from the plugging.
- If the oil viscosity is too high or the oil temperature is too low, the operating conditions (chapter "15 Technical data") have not been complied with. In this case, precautions have to be taken in order to comply with the operating conditions.
- Renew or clean a contaminated filter (chapter "9.5 Exchanging the filter element").

9 Maintenance and repair

9.1 Cleaning and care

CAUTION!

Penetrating dirt and penetrating liquids will cause faults!

Safe function of the off-line filter system is no longer ensured.

- Always provide for utmost cleanness when working at the hydraulic system.
- Do not use a pressure washer.

CAUTION!

Damage to the surface from solvents and aggressive cleaning agents!

Aggressive cleaning agents may damage the seals of the off-line filter system and make them age faster.

- Never use solvents or aggressive cleaning agents.
- Do not use pressure washers for cleaning.

CAUTION!

Damage to the hydraulic system and seals!

The water pressure of a pressure washer can damage the hydraulic system and seals of the off-line filter system. The water displaces the oil from the hydraulic system and seals.

- Do not use pressure washers for cleaning.

- Cover all openings with the appropriate protective caps / devices.
- Check that all seals and caps of the plug-in connections are firmly fitted so that no humidity can penetrate the off-line filter system.
- Only clean the off-line filter system using a damp, lint-free cloth. Only use water and a mild cleaning agent, if necessary, to do so.

9.2 Maintenance

If used as intended, the off-line filter system is maintenance-free.

9.3 Replacing wear parts

The wear parts of the off-line filter system are shown in the following figure.

- Use the material numbers specified in this table for ordering the wear parts from Bosch Rexroth.

Table 3: Wear parts

Wear part	Material number
Main filter element	Rating see name plate
Protective pump filter	Rating see name plate

For the addresses of foreign subsidiary please refer to www.boschrexroth.com and chapter "16.1 Address directory".

9.4 Exchanging the suction filter (protective pump filter)

Switch off the off-line filter system at the on/off switch and separate the off-line filter system from the voltage supply.

- Unscrew the filter bowl (3) and pull the filter element (2) off the centering spigot on the filter head (1).
- Replace the filter element by putting the new filter element onto the centering spigot (it may be necessary to remove the protective foil in advance).
- Screw on the filter bowl again and fasten it hand-tight (fig. 7).

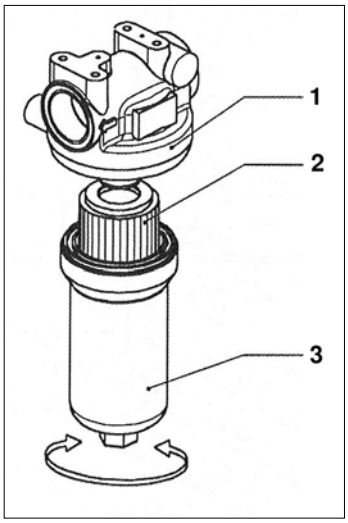


Fig. 7: Protective pump filter set-up

1 Filter head
2 Filter element
3 Filter bowl

9.5 Exchanging the filter element

During operation, the pressure differential is monitored at the maintenance indicator at the main filter. If the pressure differential exceeds the value of 2.5 bar, the pressure resistance in the suction line is too high.

This may be due to the following causes:

- Plugged pipe socket and/or plugged suction line;
- Oil viscosity too high / oil temperature too low;
- Contaminated filter.

Risk of cavitation!

- Cavitation leads to early pump wear. Symptoms of cavitation include knocking sound in the pump and/or excessive vibrations of the entire unit.

- Remedy the cause for the excessive pressure resistance in the suction line.
- Clear a plugged pipe socket and/or a plugged suction line from the plugging.
- If the oil viscosity is too high or the oil temperature is too low, the operating conditions (chapter "15 Technical data") have not been complied with. In this case, precautions have to be taken in order to comply with the operating conditions.
- Renew or clean a contaminated filter.

CAUTION!

Switch off the off-line filter system at the on/off switch and separate the off-line filter system from the voltage supply.

- Unscrew the filter head (1) and take the filter element (2) out of the filter housing (3).
- Replace the filter element by installing the new filter element (it may be necessary to remove the protective foil in advance).
- Screw on the filter bowl again and fasten it hand-tight (fig. 8).

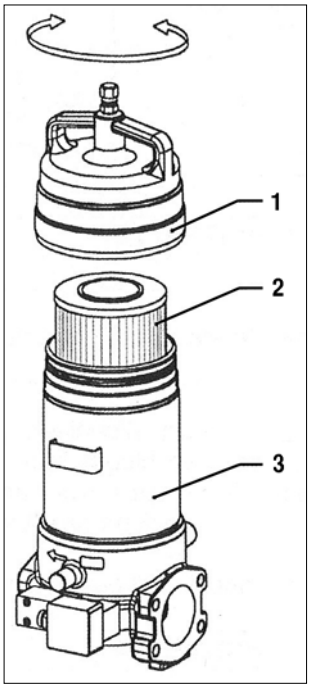


Fig. 8: Main filter set-up

1 Filter head
2 Filter element
3 Filter housing

9.6 Repair

Bosch Rexroth offers a wide range of repair services for the off-line filter system.

- Only use genuine spare parts from Bosch Rexroth for repairing the Rexroth product.
- Tested and pre-assembled original Rexroth assemblies allow for successful repair requiring only little time.

9.7 Spare parts

CAUTION!

Damage to property and personal injuries due to faulty spare parts!

Spare parts that do not meet the technical requirements specified by Bosch Rexroth may cause personal injuries and damage to property.

▶ Use genuine Rexroth spare parts.

▶ Order spare parts in writing. In urgent cases you can also order by phone, but you are kindly requested to confirm your order in writing e.g. by fax.

▶ Please send your spare parts order to the Bosch Rexroth service next to you or directly to the headquarters (see chapter "16.1 Address directory").

▶ When ordering spare parts, please indicate the following information from the name plate:

– The serial number

– The order number

▶ Please indicate the following details from the parts list:

– The exact denomination

– The material number

▶ Additionally indicate:

– The desired number of spare parts

The following spare parts are available for the off-line filter system:

Table 4: Spare parts

Component	Order number
Frame	Please indicate the ordering information of the filter system
Filter pump	Please indicate the ordering information of the filter system
Filter element	Please indicate the ordering information of the filter cartridge
Suction filter	Rating see name plate
Vacuum meter	Please indicate the ordering information of the vacuum meter
Main filter element	Rating see name plate

For the addresses of foreign subsidiary please refer to www.boschrexroth.com and chapter "16.1 Address directory".

10 Disposal

10.1 Environmental protection

Careless disposal of the off-line filter system and the hydraulic fluid could lead to environmental pollution.

- Thus, dispose of the off-line filter system and the hydraulic fluid in accordance with the currently applicable national regulations in your country.
- Dispose of hydraulic fluid residues according to the respective safety data sheets valid for these hydraulic fluids.

11 Extension and conversion

Do not retrofit the off-line filter system.

The Bosch Rexroth warranty applies to the delivered configuration and the extensions considered in this configuration. After an extension or a conversion exceeding the conversions and extensions described here, the warranty will forfeit.

Unauthorized conversions or extensions will invalidate the declaration of conformity and thus the CE mark.

12 Troubleshooting

12.1 How to proceed for troubleshooting

- Always work systematically and focused, even when under time pressure. Random and imprudent disassembly and readjustment of settings might result in the inability to restore the original error cause.
- First get a general idea of how your product works in conjunction with the overall system.
- Try to find out whether the product has worked properly in conjunction with the overall system before the error occurred first.
- Try to determine any changes of the overall system in which the product is integrated:
  - Were there any changes to the product's operating conditions or operating range?
  - Were there any changes or repair works on the overall system (machine/system, electrics, control) or on the product? If so: What were they?
  - Was the product or machine used as intended?
  - How did the fault become apparent?
- Try to get a clear idea of the cause of the fault. Ask the direct (machine) operator, if necessary.

Table 5: Fault table

Fault	Possible cause	Remedy
Cavitation	Incorrectly introduced suction hose	Correct the position
Pump is running on block	Pressure hose plugged	Clear the pressure hose
	Filter element contaminated	Exchange the filter element
Pump does not deliver correctly	Filter element contaminated	Exchange the filter cartridge
Pressure differential > 2.5 bar	Suction line plugged	Clear the suction line
	Pressure line plugged	Clear the pressure line

If you could not remedy the occurred fault, please contact one of the addresses you find at www.boschrexroth.com or in chapter "16.1 Address directory".

13 Technical data

Table 6: General data 30, 50 NFF2

General data	30 NFF2	50 NFF2
Dimensions (width x height x depth)	600 x 1.160 x 580 [mm]	600 x 1.160 x 580 [mm]
Product weight	72 kg	84 kg
Temperature range for application	–10 - +60 °C	–10 - +60 °C
Storage temperature range	+5 - +30 °C	+5 - +30 °C
Admissible viscosity	10 - 200 mm^2/s	10 - 200 mm^2/s
Max. operating pressure	6 bar	6 bar
Max. oil temperature	60 °C	60 °C
Nominal flow	30 l/min	50 l/min
Nominal width suction / pressure	DN 30 / DN 25	DN 40 / DN 30
Protection class EN 60529/IEC529	IP54	IP54
Electric data	400 V / 50 Hz	400 V / 50 Hz
Pump motor power	1.1 kW	1.5 kW

Table 7: General data 80 NFF2

General data	80 NFF2 0120	80 NFF2 0270
Dimensions (width x height x depth)	600 x 1.160 x 580 [mm]	650 x 1.390 x 1.020 [mm]
Product weight	90 kg	150 kg
Temperature range for application	–10 - +60 °C	–10 - +60 °C
Storage temperature range	+5 - +30 °C	+5 - +30 °C
Admissible viscosity	10 - 200 mm^2/s	10 - 200 mm^2/s
Max. operating pressure	6 bar	6 bar
Max. oil temperature	60 °C	60 °C
Nominal flow	80 l/min	80 l/min
Nominal width suction / pressure	DN 45 / DN 30	DN 45 / DN 30
Protection class EN 60529/IEC529	IP54	IP54
Electric data	400 V / 50 Hz	400 V / 50 Hz
Pump motor power	1.5 kW	2.2 kW

Table 8: Considered standards and directives

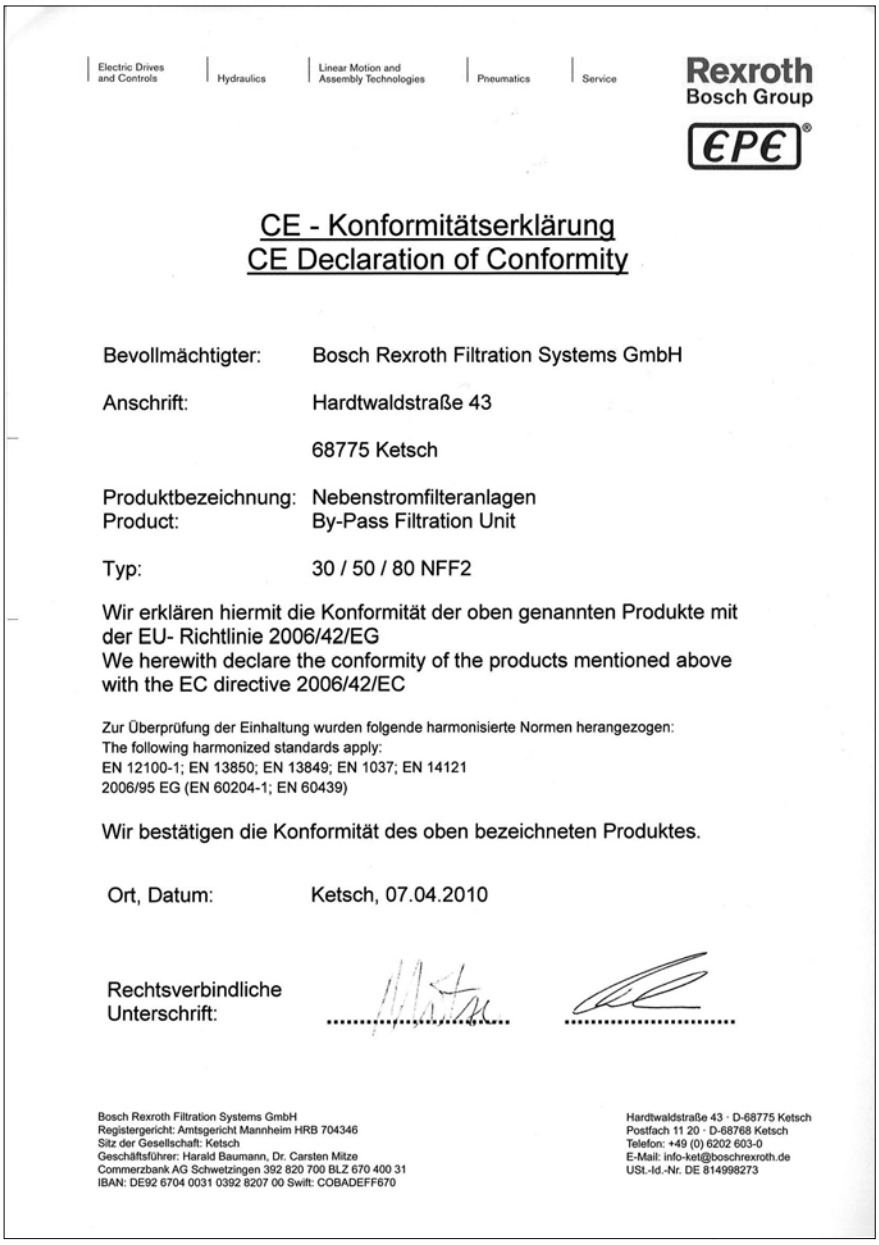
Considered standards and directives	
Directive 89/336 EEC	"Electromagnetic compatibility" (EMC directive)
97/23/EC	Pressure Equipment Directive

14 Appendix

14.1 Address directory

Please refer to http://www.boschrexroth.com for addresses of foreign subsidiaries.

14.2 Declaration of conformity



Electric Drives and Controls | Hydraulics | Linear Motion and Assembly Technologies | Pneumatics | Service

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CE

CE - Konformitätserklärung
CE Declaration of Conformity

Bevollmächtigter:	Bosch Rexroth Filtration Systems GmbH
Anschrift:	Hardtwaldstraße 43
	68775 Ketsch
Produktbezeichnung:	Nebenstromfilteranlagen
Product:	By-Pass Filtration Unit
Typ:	30 / 50 / 80 NFF2

Wir erklären hiermit die Konformität der oben genannten Produkte mit der EU- Richtlinie 2006/42/EG
We herewith declare the conformity of the products mentioned above with the EC directive 2006/42/EC

Zur Überprüfung der Einhaltung wurden folgende harmonisierte Normen herangezogen:
The following harmonized standards apply:
EN 12100-1; EN 13850; EN 13849; EN 1037; EN 14121
2006/95 EG (EN 60204-1; EN 60439)

Wir bestätigen die Konformität des oben bezeichneten Produktes.

Ort, Datum: Ketsch, 07.04.2010

Rechtsverbindliche Unterschrift: .....

Bosch Rexroth Filtration Systems GmbH
Registergericht: Amtsgericht Mannheim HRB 704346
Sitz der Gesellschaft: Ketsch
Geschäftsführer: Harald Baumann, Dr. Carsten Mitze
Commerzbank AG Schwetzingen 392 820 700 BLZ 670 400 31
IBAN: DE92 6704 0031 0392 8207 00 Swift: COBADEFF670

Hardtwaldstraße 43 · D-68775 Ketsch
Postfach 11 20 · D-68768 Ketsch
Telefon: +49 (0) 6202 603-0
E-Mail: info-ket@boschrexroth.de
USt.-Id.-Nr: DE 814998273

Rexroth
Bosch Group

Bosch Rexroth AG
Industrial Hydraulics
Zum Eisengießer 1
97816 Lohr am Main
Germany

Phone +49 (9352) 18-0
Fax +49 (9352) 18-40

documentation@boschrexroth.de
www.boschrexroth.de

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