



**Off-line Filter**

**FN 060 · FN 300**

- In-line mounting
- Operating pressure up to 12 bar
- Nominal flow rate up to 650 l/min

## Description

### Application

Main flow filter or off-line filter in hydraulic and lubricating systems.

### Performance features

Protection

against wear: By means of filter elements that in full-flow filtration, meet even the highest demands regarding cleanliness classes.

Protection against

malfunction: Through installation near to the control valves or other expensive components. The specific determined flow rate guarantees a closed by-pass valve even at  $v \leq 200 \text{ mm}^2/\text{s}$  (cold start condition).

### Special design features

Cover: The cover of the FN 060 can be opened without special auxiliary tools. Fold-out handle parts at the cover of the FN 300 for easy opening.

Automatic

ventilation valve

(only FN 300):

The quick automatic deaeration after putting into operation prevents components from consequential damage by a too high air amount in the oil as e.g. prevention of cavitation damages and micro diesel effect.

Dirt retention

valve:

On the bottom of the from inside to outside flown through filter elements, there is a dirt retention valve. If the filter element is pulled out of the filter housing with the cover the dirt retention valve will close. Sedimented dirt is removed from the housing with the filter element. Because of the design of the cover the filter element can be changed almost without loosing any oil.

### Filter elements

Flow direction from centre to outside. The star-shaped pleating of the filter material results in:

- large filter surfaces
- low pressure drop
- high dirt holding capacities
- long service life

### Filter maintenance

By using a clogging indicator the correct moment for maintenance is stated and guarantees the optimum utilization of the filter.

### Materials:

Filter head: Aluminium alloy

Filter housing: Steel (FN 060)

Aluminium alloy (FN 300)

Cover: Aluminium alloy

Seals: NBR (FPM on request)

Filter media: EXAPOR®MAX 2 - inorganic, multi-layer microfibre web

### Accessories

Water-absorbing filter elements (EXAPOR® AQUA) are available on request.

For FN 060 a bleeder screw is available on request and with Part no. FNS 060.1720 a fastening kit.

Electrical and/or optical clogging indicators are available on request – optionally with one or two switching points resp. temperature suppression. Dimensions and technical data of the clogging indicators see catalogue sheet 60.30.

## Characteristics

### Operating pressure

Max. 12 bar (FN 060)

Max. 10 bar (FN 300)

### Nominal flow rate

Up to 650 l/min (see Selection Chart, column 2)

The nominal flow rates indicated by ARGO-HYTOS are based on the following features:

- closed by-pass valve at  $v \leq 200 \text{ mm}^2/\text{s}$
- element service life > 1000 operating hours at an average fluid contamination of 0,07 g per l/min flow volume
- flow velocity in the connection lines: up to 10 bar  $\leq 4,5 \text{ m/s}$

### Filter fineness

3  $\mu\text{m(c)}$  ... 10  $\mu\text{m(c)}$

$\beta$ -values according to ISO 16889

(see Selection Chart, column 4 and diagram Dx)

### Dirt-holding capacity

Values in g test dust ISO MTD according to ISO 16889

(see Selection Chart, column 5)

### Hydraulic fluids

Mineral oil and biodegradable fluids

(HEES and HETG, see info-sheet 00.20)

### Temperature range

- 30°C ... + 100°C (temporary - 40°C ... + 120°C)

### Viscosity at nominal flow rate

• at operating temperature:  $v < 35 \text{ mm}^2/\text{s}$

• as starting viscosity:  $v_{\text{max}} = 1.200 \text{ mm}^2/\text{s}$

• at initial operation: The recommended starting viscosity can be read from the diagram D (pressure drop as a function of the kinematic viscosity) as follows: Find the 70 %  $\Delta p$  of the cracking pressure of the by-pass valve on the vertical axis. Draw a horizontal line so that it intersects the  $\Delta p$  curve at a point. Read this point on the horizontal axis for the viscosity.

### Mounting position

Vertical, connection port at the bottom

### Connection

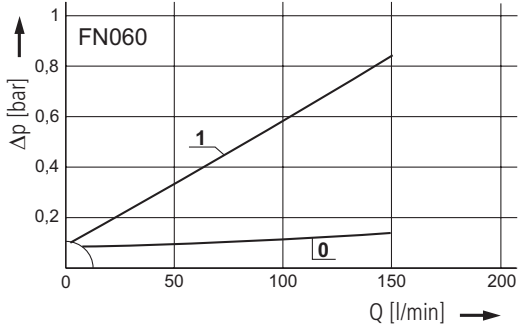
Threaded ports according to ISO 228 or DIN 13 (FN 060) or flange mounting according to SAE-J518 (FN 300).

Sizes see Selection Chart, column 6 (other port threads on request).

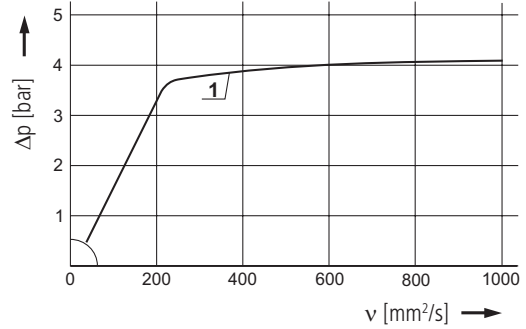
## Diagrams

### $\Delta p$ -curves for complete filters in Selection Chart, column 3

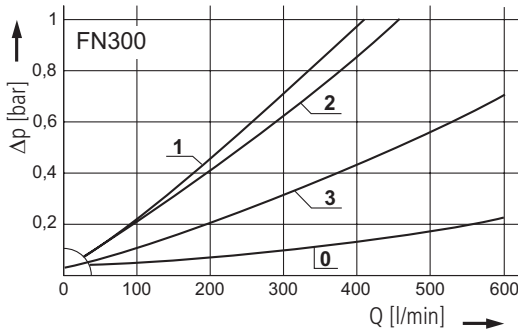
**D1** Pressure drop as a function of the **flow volume**  
at  $v = 35 \text{ mm}^2/\text{s}$  (0 = casing empty)



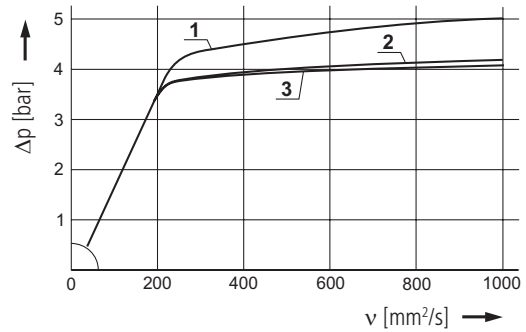
Pressure drop as a function of the **kinematic viscosity**  
at nominal flow



**D2** Pressure drop as a function of the **flow volume**  
at  $v = 35 \text{ mm}^2/\text{s}$  (0 = casing empty)

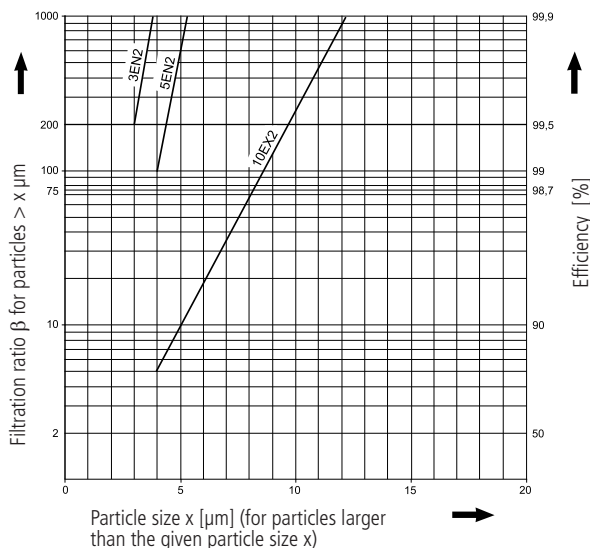


Pressure drop as a function of the **kinematic viscosity**  
at nominal flow



### Filter fineness curves in Selection Chart, column 4

**Dx** Filtration ratio  $\beta$  as a function of particle size  $x$  obtained by the  
Multi-Pass-Test according to ISO 16889



The abbreviations represent the following  $\beta$ -values resp. finenesses:

**For EXAPOR<sup>®</sup>MAX 2-Elements:**

**3EN2** =  $\bar{\beta}_{3(c)} = 200$  EXAPOR<sup>®</sup>MAX 2

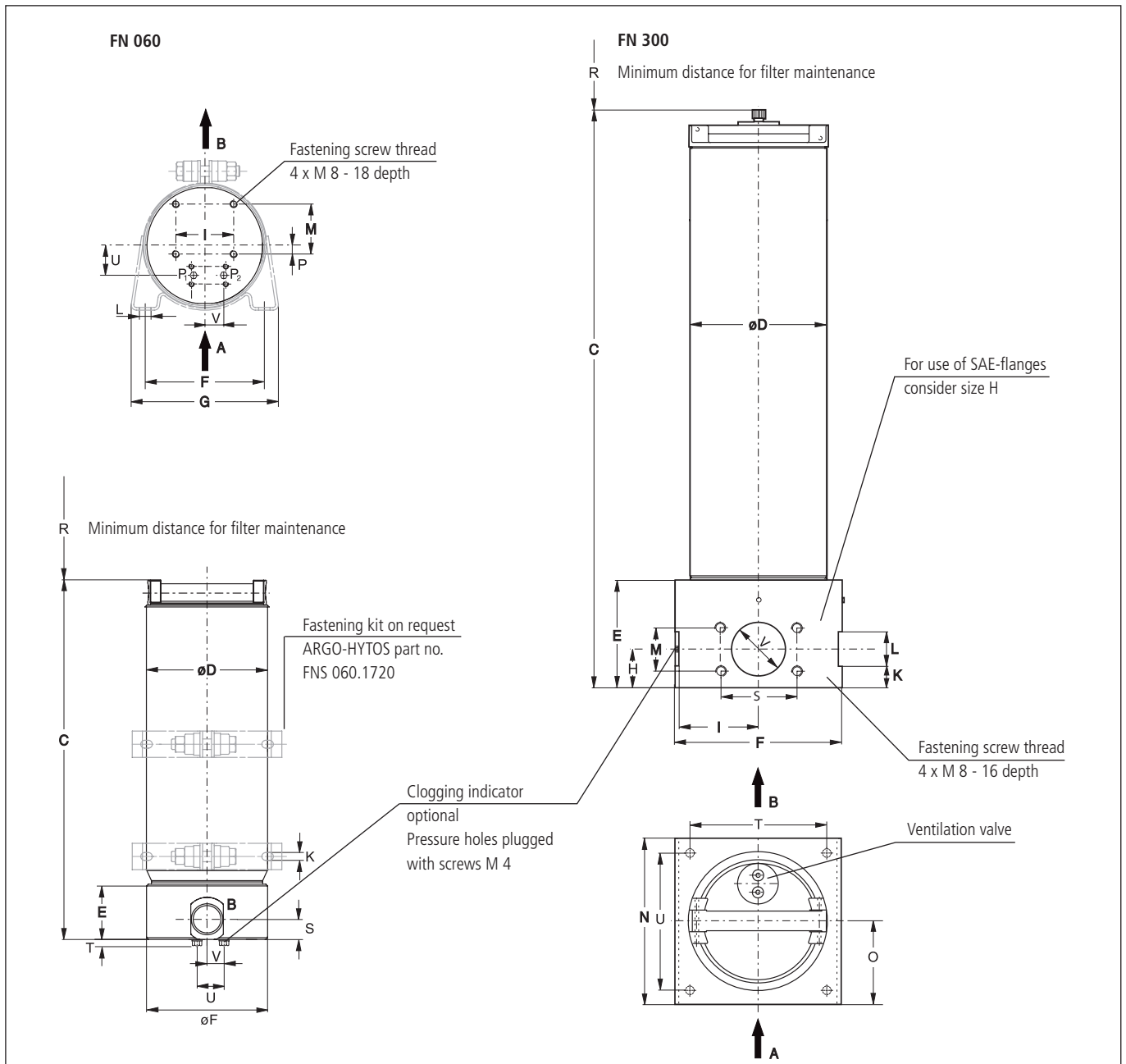
**5EN2** =  $\bar{\beta}_{5(c)} = 200$  EXAPOR<sup>®</sup>MAX 2

**10EX2** =  $\bar{\beta}_{10(c)} = 200$  EXAPOR<sup>®</sup>MAX 2

For special applications, finenesses differing from these curves are also available by using special composed filter media.



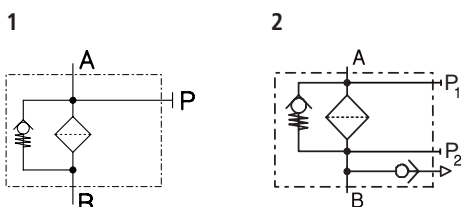
## Dimensions



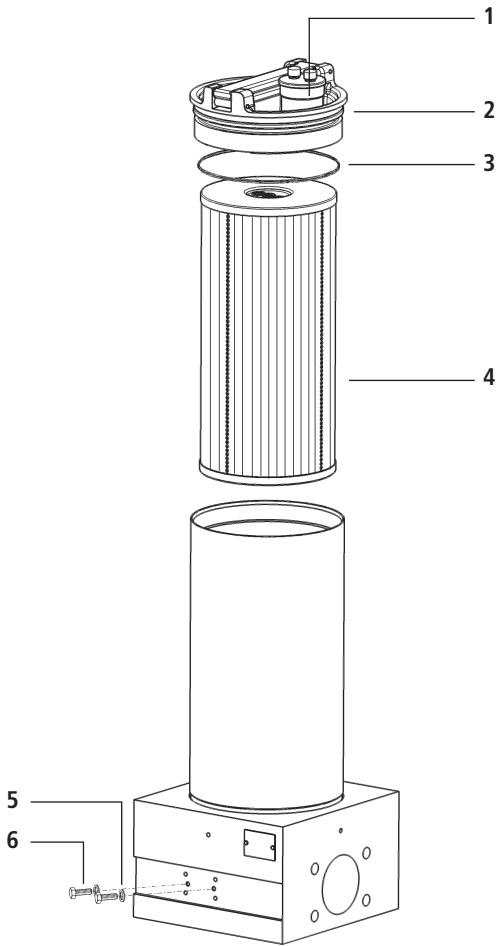
## Measurements

| Type   | A / B | C   | D   | E   | F   | G   | H  | I  | K  | L  | M    | N   | O    | P   | R   | S    | T   | U   | V  |
|--------|-------|-----|-----|-----|-----|-----|----|----|----|----|------|-----|------|-----|-----|------|-----|-----|----|
| FN 060 | G1    | 410 | 140 | 63  | 136 | 170 | -  | 66 | 9  | 12 | 56,5 | -   | -    | 9,5 | 300 | 23   | 4   | 34  | 21 |
| FN 300 | SAE2½ | 775 | 160 | 126 | 200 | -   | 45 | 96 | 25 | 40 | 50,8 | 195 | 97,5 | -   | 700 | 88,9 | 170 | 165 | 63 |

## Symbols



## Spare Parts



| Pos. | Designation   | Part No.         |
|------|---|------------------|
| 1    | Automatic ventilation valve (FN 300)                                | FA 016.1801      |
| 2a   | Cover (FN 060)  | FNA 008.1290     |
| 2b   | Cover (FN 300)<br>(with automatic ventilation valve<br>and Pos. 3b) | FNA 045.1210     |
| 3a   | O-ring 117,48 x 5,3 (FN 060)  | N007.1175        |
| 3b   | O-ring 145,42 x 5,33 (FN 300)                                       | N007.1455        |
| 4    | Filter element  | see Chart/col. 9 |
| 5    | Bonded seal 4,1 x 7,2 x 1   | 12504600         |
| 6    | Hexagonal head screw M 4 x 8<br>DIN EN ISO 4017                     | 11385800         |

The function of the complete filters as well as the outstanding features of the filter elements assured by ARGO-HYTOS can only be guaranteed if original ARGO-HYTOS spare parts are used.

## Quality Assurance

### Quality management according to DIN EN ISO 9001

To ensure constant quality in production and operation, ARGO-HYTOS filter elements undergo strict controls and tests according to the following ISO standards:

|                 |   |
|-----------------|---|
| <b>ISO 2941</b> | Verification of collapse/burst pressure rating            |
| <b>ISO 2942</b> | Verification of fabrication integrity (Bubble Point Test) |
| <b>ISO 2943</b> | Verification of material compatibility with fluids        |

|                  |   |
|------------------|---|
| <b>ISO 3968</b>  | Evaluation of pressure drop versus flow characteristics                   |
| <b>ISO 16889</b> | Multi-Pass-Test (evaluation of filter fineness and dirt-holding capacity) |
| <b>ISO 23181</b> | Determination of resistance to flow fatigue using high viscosity fluid    |

Various quality controls during the production process guarantee the leakfree function and solidity of our filters.

Our engineers will be glad to advise you in questions concerning filter application, selection as well as the cleanliness class of the filtered medium attainable under practical operating conditions.

Illustrations may sometimes differ from the original. ARGO-HYTOS is not responsible for any unintentional mistake in this specification sheet.



### We produce fluid power solutions

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