

**Return Filters**

**E 210 · E 211 · E 221**

- Tank top mounting
- Connection up to G1¼
- Nominal flow rate up to 210 l/min

## Description

### Application

In the return line circuits of hydraulic 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: By means of full-flow filtration in the system return, the pumps above all are protected from dirt particles remaining in the system after assembly, repairs, or which are generated by wear or enter the system from outside.

### Special features

By-pass valve: The location close to the inlet port prevents dirt particles retained by the filter element from entering into the clear oil side.

Removable bowl: In case of maintenance the filter bowl is removed together with the filter element - therefore dirt particles are not flushed back into the tank.

### Filter elements

Flow direction from outside to centre. 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 life.

### Materials

Screw-on cap:	Polyester, GF reinforced
Filter head:	Aluminium alloy
Filter bowl:	Steel
Seals:	NBR (Viton on request)
Filter media:	EXAPOR®MAX - inorganic multi-layer microfibre web Paper - cellulose web, impregnated with resin

### Accessories

Electrical and optical clogging indicators are available.  
Dimensions and technical data see catalogue sheet 60.20.

## Characteristics

### Nominal flow rate

Up to 210 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  $\leq 4,5 \text{ m/s}$

### Connection

Threaded ports according to ISO 228 or DIN 13. Sizes see Selection Chart, column 6 (other port threads on request)

### Filter fineness

5  $\mu\text{m(c)}$  ... 30  $\mu\text{m(c)}$   
 $\beta$ -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 or 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:  $v < 60 \text{ mm}^2/\text{s}$
- as starting viscosity:  $v_{\text{max}} = 1200 \text{ mm}^2/\text{s}$
- at first 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.

### Operating pressure

Max. 10 bar

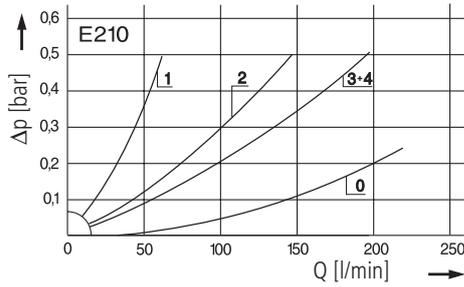
### Mounting position

Preferably vertical, outlet downwards

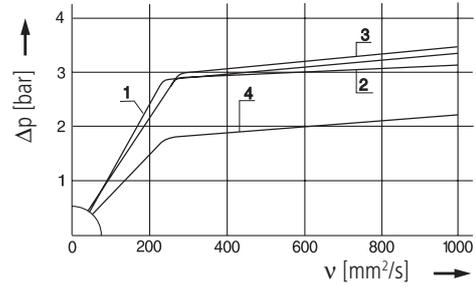
# Diagrams

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

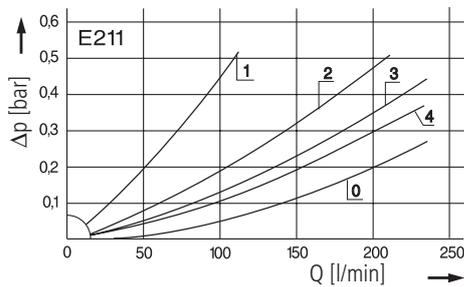
**D1** Pressure drop as a function of the **flow volume**  
at  $v = 35 \text{ mm}^2/\text{s}$  (0=casing empty)



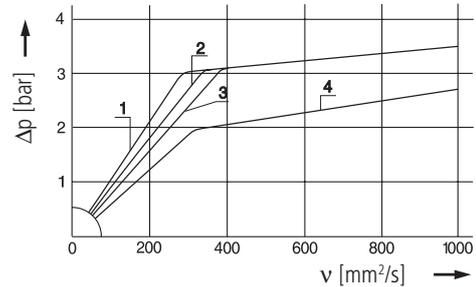
Pressure drop as a function of the **kinematic viscosity**  
at nominal flow



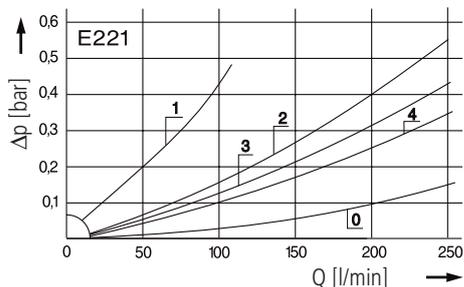
**D2** Pressure drop as a function of the **flow volume**  
at  $v = 35 \text{ mm}^2/\text{s}$  (0=casing empty)



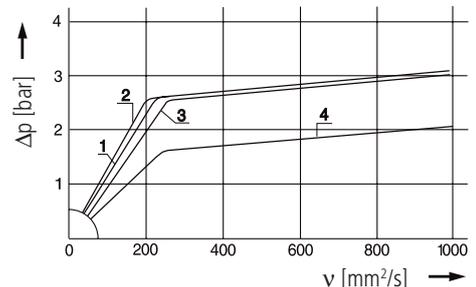
Pressure drop as a function of the **kinematic viscosity**  
at nominal flow



**D3** Pressure drop as a function of the **flow volume**  
at  $v = 35 \text{ mm}^2/\text{s}$  (0=casing empty)

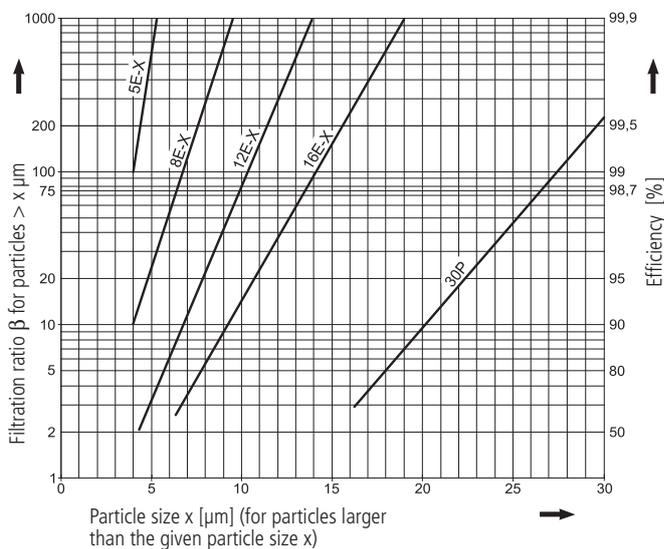


Pressure drop as a function of the **kinematic viscosity**  
at nominal flow



## 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® MAX- and Paper elements:**

- 5 E-X** =  $\beta_{5(c)}$  = 200 EXAPOR®MAX
- 8 E-X** =  $\beta_{8(c)}$  = 200 EXAPOR®MAX
- 12 E-X** =  $\beta_{12(c)}$  = 200 EXAPOR®MAX
- 16 E-X** =  $\beta_{16(c)}$  = 200 EXAPOR®MAX
- 30 P** =  $\beta_{30(c)}$  = 200 Paper

Based on the structure of the filter media of the 30 P paper elements, deviations from the printed curves are quite probable.

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

## Selection Chart

	Part No.	Nominal flow Pressure drop see Diagram D/curve no.	Filter fineness see Diagr. Dx	Dirt-holding capacity	Connection A	Cracking pressure of by-pass	Symbol	Replacement filter element Part No.	Weight	Remarks	
	l/min		g		bar				kg		
	1	2	3	4	5	6	7	8	9	10	11
E 210-59	60	D1/1	5 E-X	25	G1	2,5	1	V2.0920-03	2,3	-	
E 210-66	130	D1/2	12 E-X	40	G1	2,5	1	V2.0920-06	2,3	-	
E 210-58	180	D1/3	16 E-X	47	G1¼	2,5	1	V2.0920-08	2,3	-	
E 210-51	120	D1/4	30 P	22	G1¼	1,5	1	P2.0920-11*	2,3	-	
E 211-59	110	D2/1	5 E-X	50	G1	2,5	1	2 x V2.0920-03	3,4	-	
E 211-56	210	D2/2	12 E-X	80	G1¼	2,5	1	2 x V2.0920-06	3,4	-	
E 211-58	210	D2/3	16 E-X	94	G1¼	2,5	1	2 x V2.0920-08	3,4	-	
E 211-51	210	D2/4	30 P	44	G1¼	1,5	1	2 x P2.0920-11*	3,4	-	
E 221-59	100	D3/1	5 E-X	36	G1	2,5	1	V2.0833-03	3,3	-	
E 221-56	210	D3/2	12 E-X	58	G1¼	2,5	1	V2.0833-06	3,3	-	
E 221-58	210	D3/3	16 E-X	67	G1¼	2,5	1	V2.0833-08	3,3	-	
E 221-51	210	D3/4	30 P	36	G1¼	1,5	1	P2.0833-01*	3,3	-	

All filters are delivered with a plugged clogging indicator connection M 12 x 1,5. As clogging indicators either manometers or electrical pressure switches can be used. Optional extension pipes adapt the filter length to various tank depths. For ordering of accessories please use the below mentioned codes.

**Order example: The filter E 210-66 has to be supplied with an extension pipe (EV) for a mounting depth of 300 mm.**

**Order description:** E 210-66 / EV 300

**Part No. (Basic unit)** \_\_\_\_\_

**Extension pipe (4 various lengths are available)** \_\_\_\_\_

E 210 / E 211: EV = K + 95 / + 195 / + 295 / + 395

E 221: EV = K + 139 / + 239 / + 339 / + 439

(see dimensions and measurements)

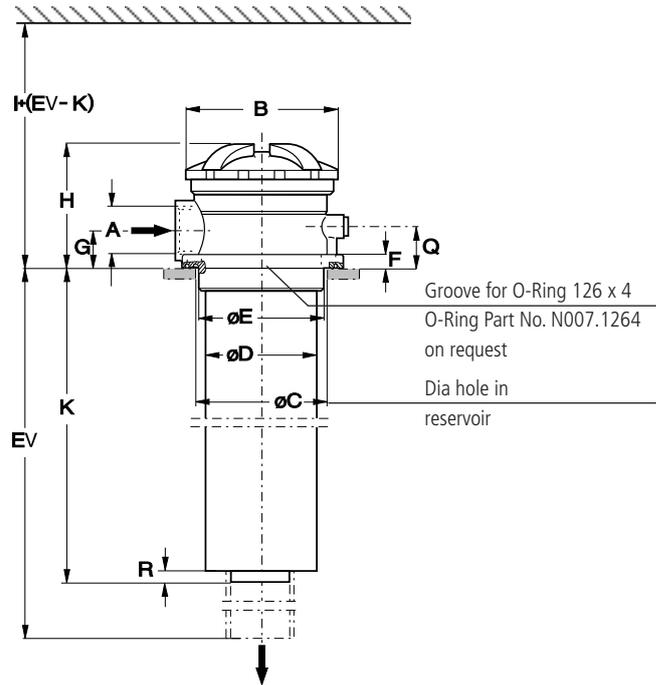
**For the appropriate clogging indicators see catalogue sheet 60.20.**

**Remarks:**

- The switching pressure of the electrical pressure switch has always to be lower than the cracking pressure of the by-pass valve (see Selection Chart, column 7).
- The clogging indicators are optionally available and will then be loosely provided.
- The filters listed in this chart are standard filters. Other designs available on request.

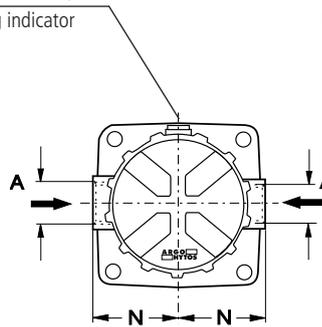
\* Paper media supported with metal gauze

## Dimensions



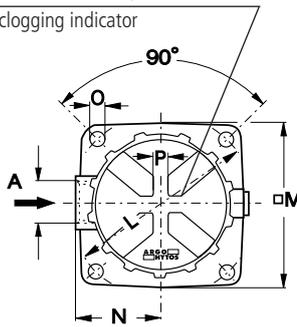
Design with 2 inlet ports on request

Connection M12 x 1,5  
for clogging indicator

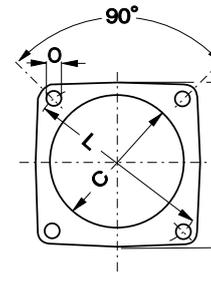


Design with 1 inlet port

Connection M12 x 1,5  
for clogging indicator



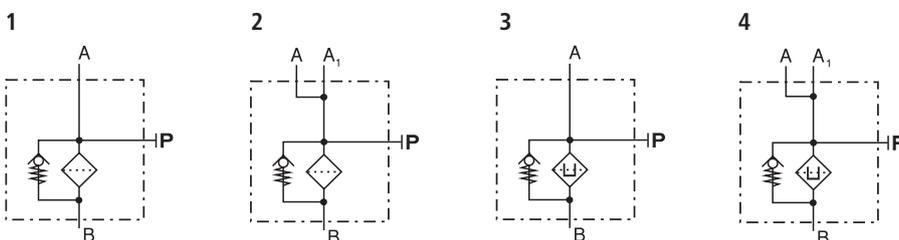
Required mounting surface



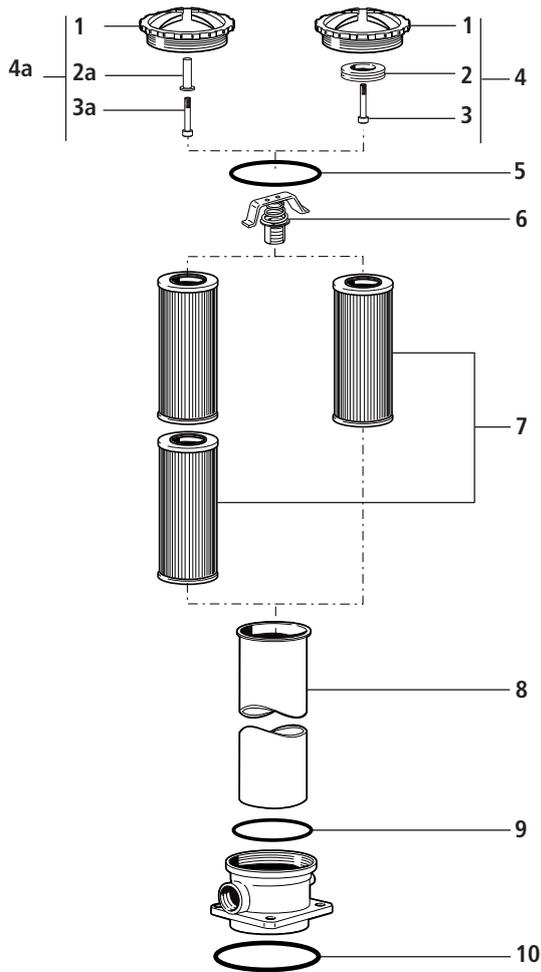
## Measurements

Type	A	B	C min./max.	D	E	F	G	H	I	K	L	M	N	O	P	Q	R
E 210	G1, G1¼	126,5	111/121	95,5	110	11,5	32	106	325	205	165	141	76	11	13	35	-
E 211	G1, G1¼	126,5	111/121	95,5	110	11,5	32	106	525	405	165	141	76	11	13	35	-
E 221	G1, G1¼	126,5	111/121	95,5	110	11,5	32	106	465	361	165	141	76	11	13	35	15

## Symbols



## Spare Parts



Pos.	Designation	Part No.
1	Screw-on cap with Pos. 5	ES 074.1212
2	Magnetic system	D 020.1401
2a	Hollow rivet A 8 x 0,75 x 25 DIN 7340-St	3309059
3	Cylinder screw assy	E 210.1201
3a	Cylinder screw M6x35 DIN 912-8.8	3302006
4	Screw-on cap assy with Pos. 5	E 210.1210
4a	Screw-on cap assy with Pos. 5	E 210.1200
5	O-ring 100 x 4	N 007.1004
6	By-pass E 210/E 211 (1,5 bar)	E 210.1903
6	By-pass E 210/E 211 (2,5 bar)	E 210.1905
6	By-pass E 221 (1,5 bar)	E 221.1903
6	By-pass E 221 (2,5 bar)	E 210.1905
7	Filter element	see Chart / col. 9
8	Filter bowl E 210 *	E 210.1901
8	Filter bowl E 211 *	E 211.1901
8	Filter bowl E 221 *	E 221.1901
9	O-ring 90 x 4	N 007.0904
10	O-ring 126 x 4 **	N 007.1264

<sup>1</sup> Specify mounting depth in mm

<sup>2</sup> Not included in basic equipment

The functions 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 DIN and ISO standards:

<b>DIN ISO 2941</b>	Verification of collapse/burst resistance
<b>DIN ISO 2943</b>	Verification of material compatibility with fluids
<b>DIN ISO 3724</b>	Verification of flow fatigue characteristics

### ISO 2942 ISO 3968 ISO 16889

Verification of fabrication integrity (Bubble Point Test)  
Evaluation of pressure drop versus flow characteristics  
Multi-Pass-Test (evaluation of filter fineness and dirt-holding capacity)

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

Our engineers will be glad to advice 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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