

# FHD series

Maximum working pressure up to 35 MPa (350 bar) - Flow rate up to 250 l/min



## INSTALLATION, SERVICE AND MAINTENANCE MANUAL AND SAFETY INSTRUCTIONS



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FHD021



FHD051



FHD326



FHD333

### High Pressure filters

#### Duplex

**Maximum working pressure up to 35 MPa (350 bar)**

**Flow rate up to 250 l/min**

FHD is a range of high pressure duplex filter with integrated changeover function to allow the filter element replacement without the system shut-down.

They are directly connected to the lines of the system through the hydraulic fittings.

#### Available features:

- Female threaded connections up to 1 1/4" and flanged connections up to 1 1/2", for a maximum flow rate of 345 l/min
- Fine filtration rating, to get a good cleanliness level into the system
- Balancing valve, available for FHD051, FHD326 and FHD333, to equalize the housing pressure before the switch.
- Bypass valve, to relieve excessive pressure drop across the filter media
- Vent ports, to avoid air trapped into the filter going into the system
- Drain ports, to remove the fluid from the housing prior the maintenance work
- Low collapse filter element "N", for use with filters provided with M25 wire mesh
- High collapse filter element "H", for use with filters not provided with bypass valve
- Low collapse filter element with external support "R", for filter element protection against the back pressure caused by the check valve or the reverse flow in filters provided with the bypass valve
- High collapse filter element with external support "S", for filter element protection against the back pressure caused by the check valve or the reverse flow in filters not provided with the bypass valve
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

- System where shut-down causes high costs
- System where shut-down causes safety issues

#### Filter housing materials

- Head: Phosphatized cast iron
- Housing: Phosphatized steel
- Bypass valve: Steel

#### Pressure

- Test pressure: 52.5 MPa (525 bar)
- Burst pressure: 105 MPa (1050 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 35 MPa (350 bar)

#### Bypass valve

- Opening pressure 600 kPa (6 bar) ±10%
- Other opening pressures on request.

#### Δp element type

- Microfibre filter elements - series R: 20 bar (not available for FHD 021)
- Microfibre filter elements - series H: 210 bar (only for FHD 021)
- Microfibre filter elements - series S: 210 bar (not available for FHD 021)
- Wire mesh filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25 °C to +110 °C

#### Connections

In-line Inlet/Outlet 90°

#### Note

FHD filters are provided for vertical mounting

## Weights [kg] and volumes [dm<sup>3</sup>]

Filter series	Weights [kg]					Volumes [dm <sup>3</sup> ]						
	Length	1	2	3	4	5	Length	1	2	3	4	5
<b>FHD 021</b>	-	8.0	9.0	9.9	-	-	-	0.06	0.12	0.22	-	-
<b>FHD 051</b>	-	16.9	17.5	18.5	19.8	-	-	0.31	0.41	0.53	0.83	-
<b>FHD 326</b>	43.0	50.0	54.0	-	-	-	0.88	1.60	2.37	-	-	-
<b>FHD 333</b>	-	74.0	79.0	98.0	-	-	-	1.75	2.52	3.35	-	-

Flow rates [l/min]

Filter series	Length	Filter element design - H Series					
		A03	A06	A10	A16	A25	M25
<b>FHD 021</b>	<b>2</b>	6	8	14	16	19	26
	<b>3</b>	10	12	18	20	22	27
	<b>4</b>	13	16	21	22	24	27

Filter series	Length	Filter element design - R Series						N Series	Filter element design - S Series				
		A03	A06	A10	A16	A25	M25		A03	A06	A10	A16	A25
<b>FHD 051</b>	<b>2</b>	39	41	51	54	59	64	35	37	48	51	58	
	<b>3</b>	45	46	54	56	61	65	41	43	52	54	60	
	<b>4</b>	50	52	58	58	62	65	47	49	56	56	61	
	<b>5</b>	56	57	61	62	63	65	53	53	57	59	63	
<b>FHD 326</b>	<b>1</b>	93	99	131	142	154	171	83	87	117	120	146	
	<b>2</b>	136	141	163	166	173	176	119	128	149	151	163	
	<b>3</b>	152	159	171	174	175	177	139	148	161	163	170	
<b>FHD 333</b>	<b>2</b>	175	184	224	230	245	249	147	162	199	201	225	
	<b>3</b>	204	217	241	245	247	252	179	196	221	224	238	
	<b>4</b>	216	224	242	247	253	255	196	204	223	225	239	

### Maximum flow rate for a complete pressure filter with a pressure drop $\Delta p = 1.5$ bar.

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

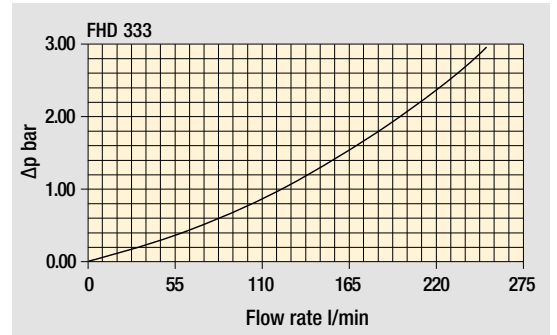
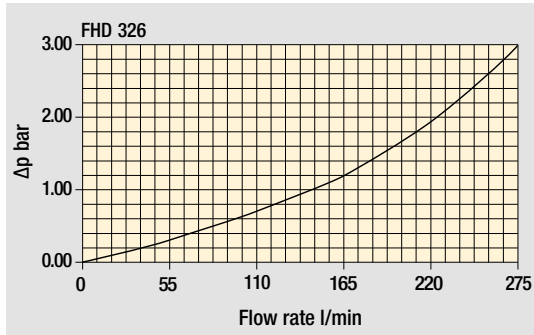
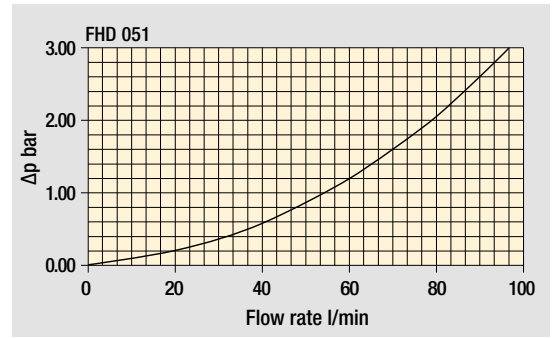
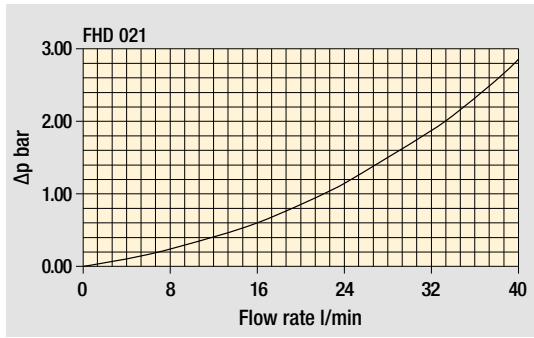
You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure. Please, contact our Sales Department for further additional information.

### Hydraulic symbols

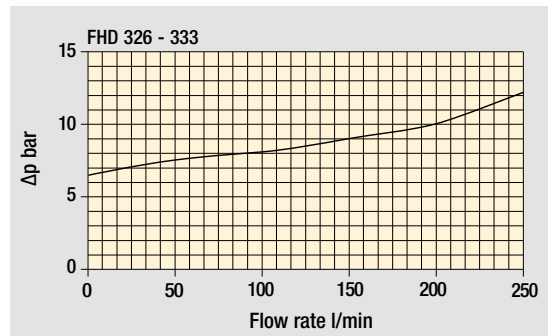
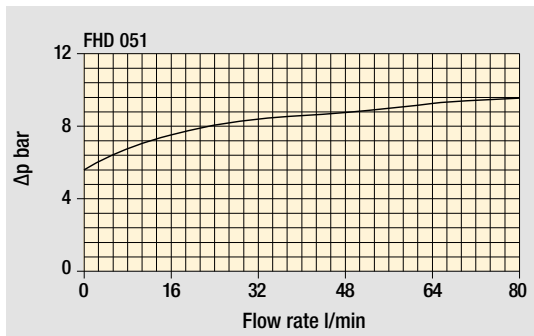
Filter series	Style S	Style B	Style B
<b>FHD 021</b>	•	-	-
<b>FHD 051</b>	•	-	-
<b>FHD 326</b>	•	-	•
<b>FHD 333</b>	•	-	•

## Pressure drop

Filter housings  $\Delta p$  pressure drop



Bypass valve pressure drop



The curves are plotted using mineral oil with density of 0.86 kg/dm<sup>3</sup> in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.



## Designation & Ordering code

### COMPLETE FILTER

<b>Series and size</b>	Configuration example: <b>FHD021</b>   <b>4</b>   <b>S</b>   <b>A</b>   <b>G1</b>   <b>A06</b>   <b>H</b>   <b>P01</b>							
<b>FHD021</b>								
<b>Length</b>								
<b>2</b>   <b>3</b>   <b>4</b>								
<b>Bypass valve</b>								
<b>S</b> Without bypass								
<b>Seals</b>								
<b>A</b> NBR								
<b>V</b> FPM								
<b>Connections</b>								
<b>G1</b> G 1/2"								
<b>G2</b> 1/2" NPT								
<b>G3</b> SAE 8 - 3/4" - 16 UNF								
<b>Filtration rating (filter media)</b>								
<b>A03</b> Inorganic microfiber 3 µm								
<b>A06</b> Inorganic microfiber 6 µm								
<b>A10</b> Inorganic microfiber 10 µm								
<b>A16</b> Inorganic microfiber 16 µm								
<b>A25</b> Inorganic microfiber 25 µm								
<b>M25</b> Wire mesh 25 µm								
	Filtration rating							
	<b>Element Δp</b>	<b>Axx</b>	<b>M25</b>	<b>Execution</b>				
	<b>N</b> 20 bar	-	•	<b>P01</b> MP Filtri standard				
	<b>H</b> 210 bar	•	•	<b>Pxx</b> Customized				

### FILTER ELEMENT

<b>Element series and size</b>	Configuration example: <b>HP011</b>   <b>4</b>   <b>A06</b>   <b>A</b>   <b>H</b>   <b>P01</b>					
<b>HP011</b>						
<b>Element length</b>						
<b>2</b>   <b>3</b>   <b>4</b>						
<b>Filtration rating (filter media)</b>						
<b>A03</b> Inorganic microfiber 3 µm						
<b>A06</b> Inorganic microfiber 6 µm						
<b>A10</b> Inorganic microfiber 10 µm						
<b>A16</b> Inorganic microfiber 16 µm						
<b>A25</b> Inorganic microfiber 25 µm						
<b>M25</b> Wire mesh 25 µm						
	Filtration rating					
	<b>Seals</b>	<b>Element Δp</b>	<b>Axx</b>	<b>M25</b>	<b>Execution</b>	
	<b>A</b> NBR	<b>N</b> 20 bar	-	•	<b>P01</b> MP Filtri standard	
	<b>V</b> FPM	<b>H</b> 210 bar	•	•	<b>Pxx</b> Customized	

### CLOGGING INDICATORS

See page 723

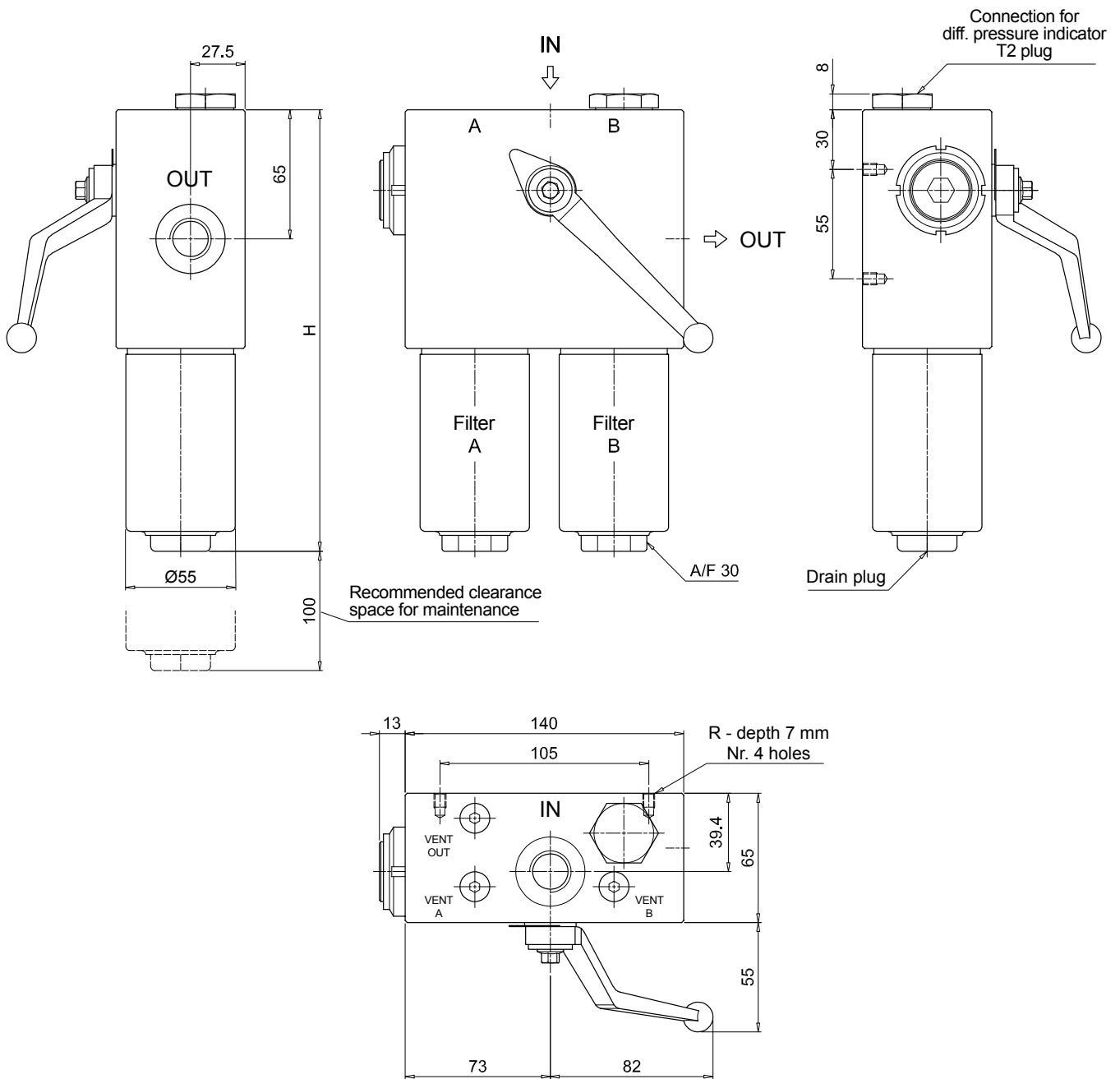
<b>DEA</b> Electrical differential pressure indicator	<b>DLE</b> Electrical / visual differential pressure indicator
<b>DEM</b> Electrical differential pressure indicator	<b>DTA</b> Electronic differential pressure indicator
<b>DEU</b> Electrical differential pressure indicator	<b>DVA</b> Visual differential pressure indicator
<b>DLA</b> Electrical / visual differential pressure indicator	<b>DVM</b> Visual differential pressure indicator

### PLUGS

See page 743

<b>T2</b> Plug (not included)
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FHDO21	
Filter length	H [mm]
2	172
3	222
4	272
Connections	R
G1	M6
G2 - G3	1/4" UNC



# FHD FHD051 - FHD326 - FHD333

## Designation & Ordering code

### COMPLETE FILTER

Series and size Configuration example: **FHD326** **3** **S** **A** **G1** **M25** **N** **P01**

**FHD051** | **FHD326** | **FHD333**

Length	FHD051	FHD326	FHD333
1	-	•	-
2	•	•	•
3	•	•	•
4	•	-	•
5	•	-	-

#### Valves

- S** Without bypass  
**B** With bypass 6 bar

#### Seals

- A** NBR  
**V** FPM

Connections	FHD051	FHD326	FHD333
<b>G1</b>	G 3/4"	G 1 1/4"	-
<b>G2</b>	3/4" NPT	-	-
<b>G3</b>	G 1/2"	1 1/4" NPT	-
<b>G4</b>	1/2" NPT	SAE 20 - 1 5/8" - 12 UN	-
<b>G5</b>	SAE 8 - 3/4" - 16 UNF	-	-
<b>G6</b>	SAE 12 - 1 1/16" - 12 UN	-	-
<b>F1</b>	-	-	1 1/2" SAE 6000 psi/M
<b>F2</b>	-	-	1 1/2" SAE 6000 psi/UNC

#### Filtration rating (filter media)

<b>A03</b> Inorganic microfiber	3 µm
<b>A06</b> Inorganic microfiber	6 µm
<b>A10</b> Inorganic microfiber	10 µm
<b>A16</b> Inorganic microfiber	16 µm
<b>A25</b> Inorganic microfiber	25 µm
<b>M25</b> Wire mesh	25 µm

Element Δp	Filtration rating		Execution
	Axx	M25	
<b>N</b> 20 bar	-	•	<b>P01</b> MP Filtri standard
<b>R</b> 20 bar	•	-	<b>Pxx</b> Customized
<b>S</b> 210 bar	•	-	

### FILTER ELEMENT

Element series and size Configuration example: **HP320** **3** **M25** **A** **N** **P01**

**HP050** | **HP320**

	FHD051	FHD326	FHD333
<b>HP050</b>	•	-	-
<b>HP320</b>	-	•	•

Element length	HP050	HP320
1	-	•
2	•	•
3	•	•
4	•	•
5	•	-

#### Filtration rating (filter media)

<b>A03</b> Inorganic microfiber	3 µm
<b>A06</b> Inorganic microfiber	6 µm
<b>A10</b> Inorganic microfiber	10 µm
<b>A16</b> Inorganic microfiber	16 µm
<b>A25</b> Inorganic microfiber	25 µm
<b>M25</b> Wire mesh	25 µm

Seals	Element Δp	Filtration rating		Execution
		Axx	M25	
<b>A</b> NBR	<b>N</b> 20 bar	-	•	<b>P01</b> MP Filtri standard
<b>V</b> FPM	<b>R</b> 20 bar	•	-	<b>Pxx</b> Customized
	<b>S</b> 210 bar	•	-	

### CLOGGING INDICATORS

See page 723

- DEA** Electrical differential pressure indicator  
**DEM** Electrical differential pressure indicator  
**DEU** Electrical differential pressure indicator  
**DLA** Electrical / visual differential pressure indicator

- DLE** Electrical / visual differential pressure indicator  
**DTA** Electronic differential pressure indicator  
**DVA** Visual differential pressure indicator  
**DVM** Visual differential pressure indicator

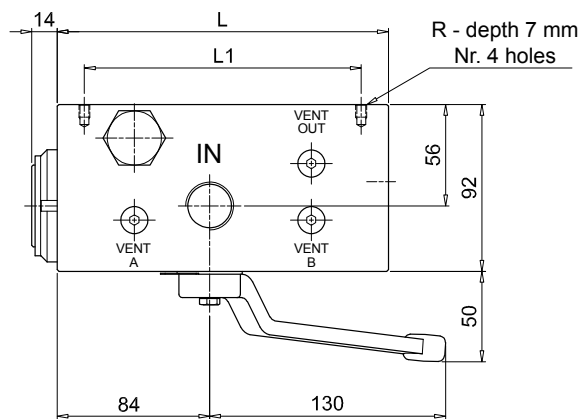
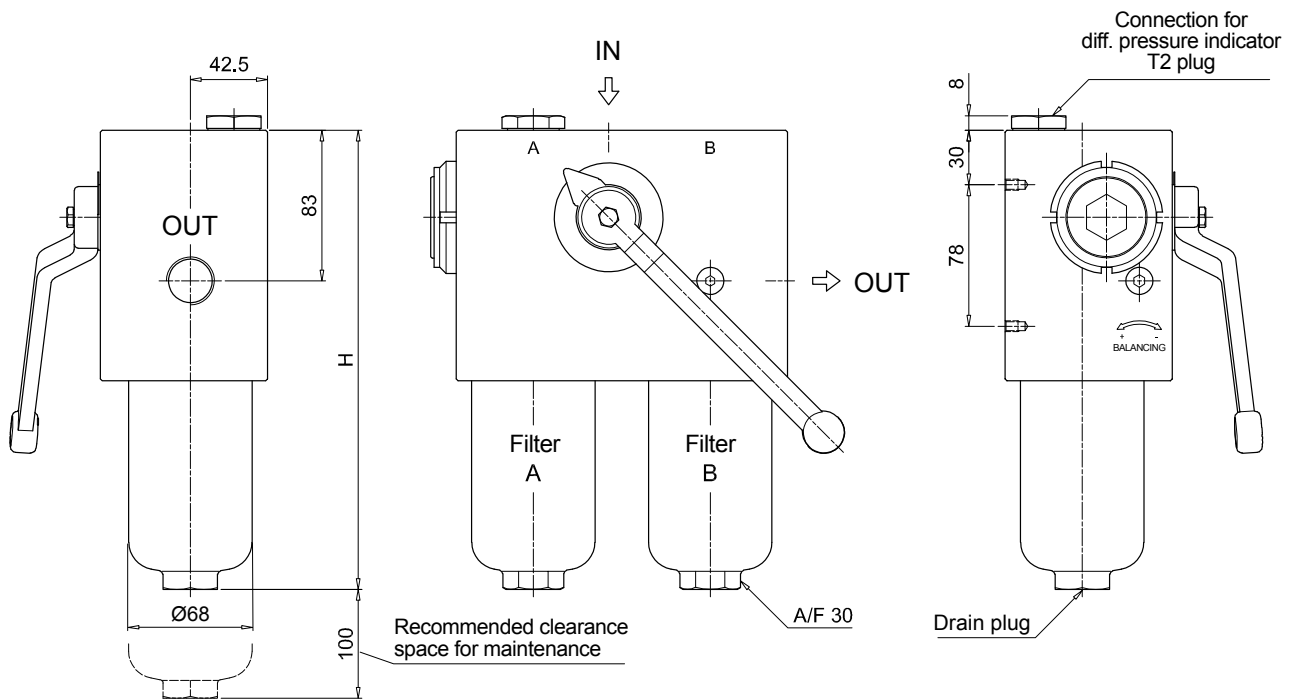
### PLUGS

See page 743

- T2** Plug (not included)



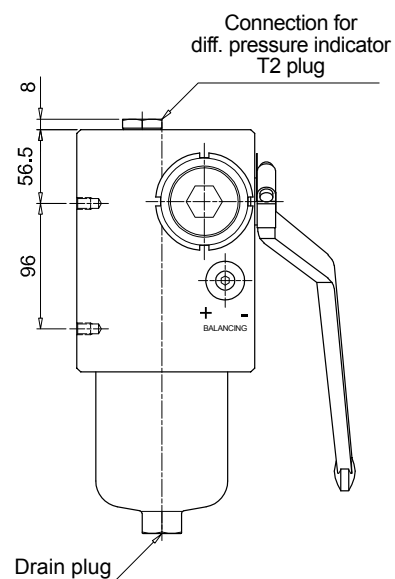
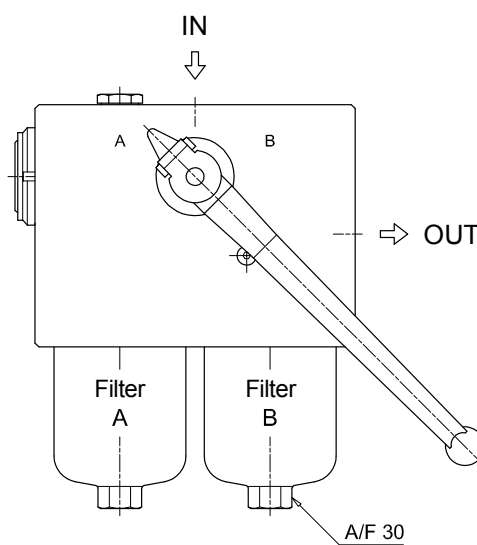
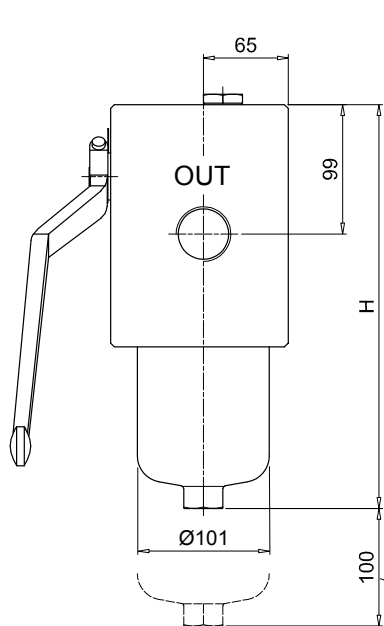
FHD051		
Filter length	H [mm]	
2	253	
3	295	
4	343	
5	465	
Connections	R	
G1	M6	
G2	1/4" UNC	
G3	M6	
G4-G5-G6	1/4" UNC	
Valves	L [mm]	L1 [mm]
S	168	138
B	182.5	152.5



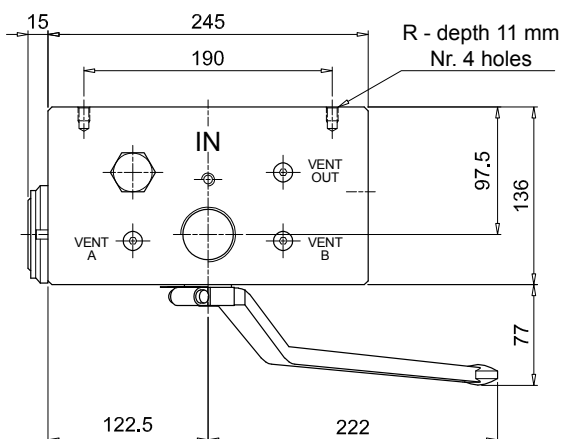
# FHD FHD051 - FHD326 - FHD333

## Dimensions

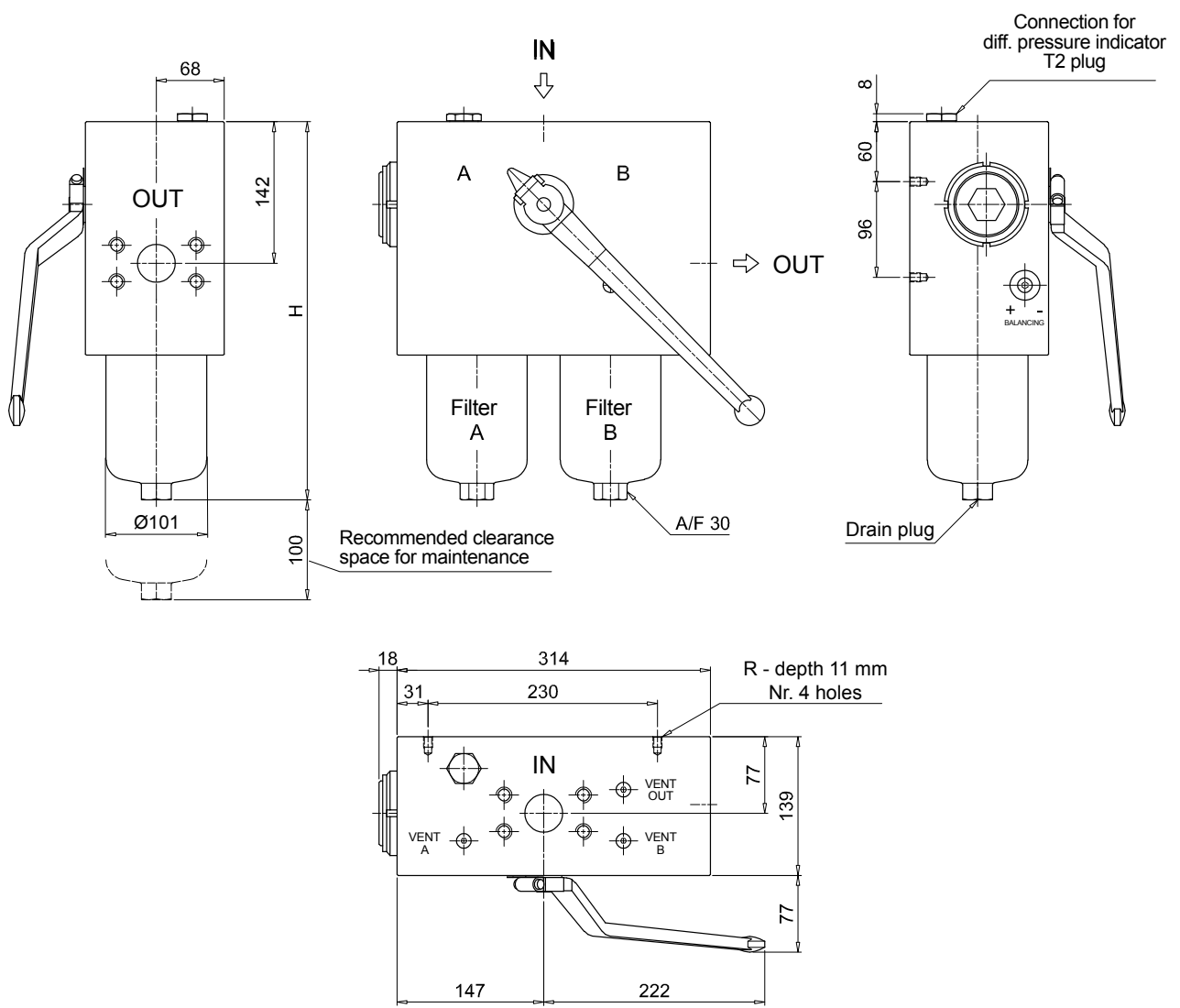
FHD326	
Filter length	H [mm]
1	309
2	432
3	564
Connections	R
G1	M10
G2 - G3	3/8" UNC



Recommended clearance space for maintenance



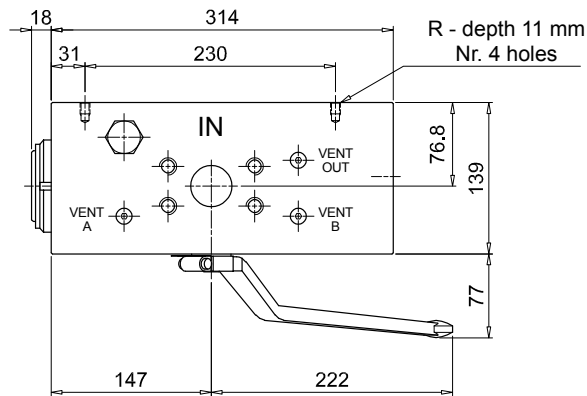
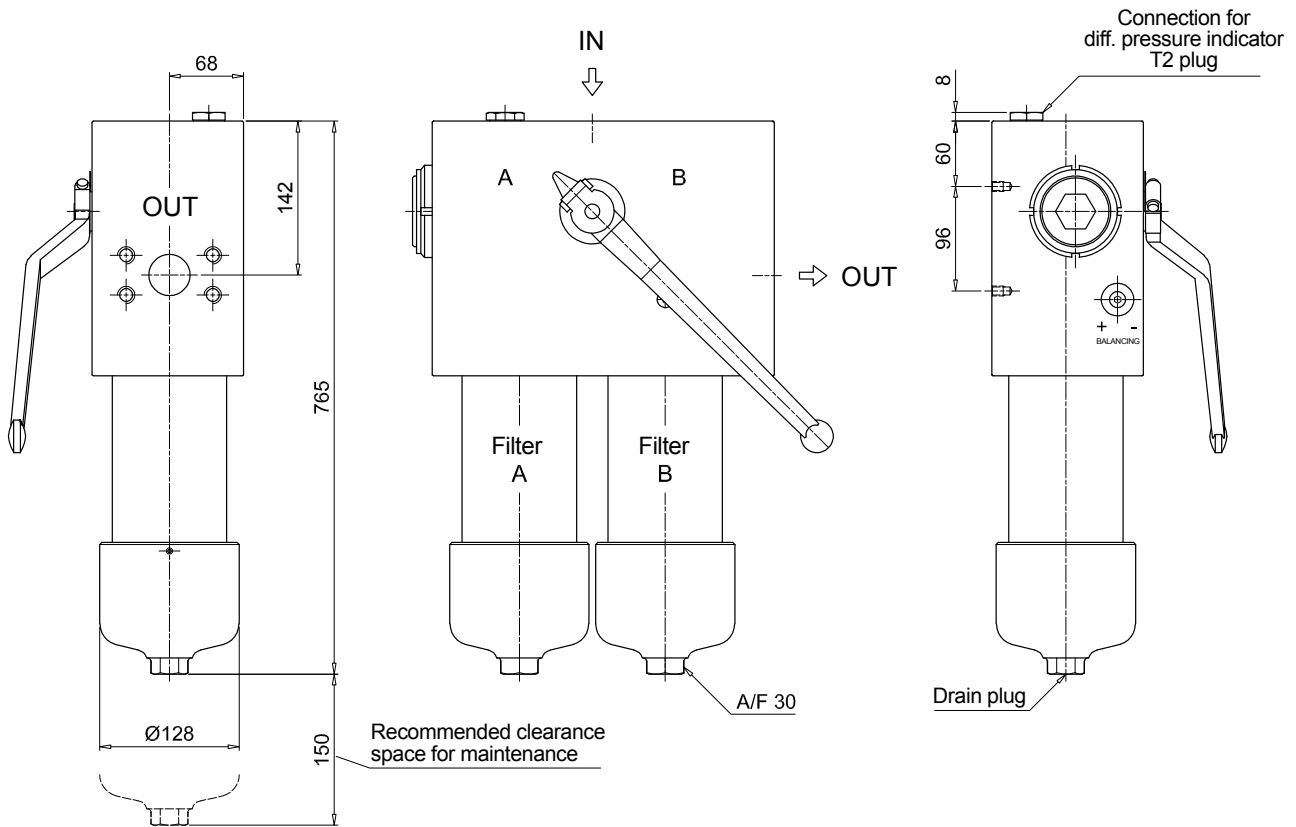
FHD333	
Length 2 - 3	
Filter length	H [mm]
2	479
3	612
Connections	R
F1	M10
F2	3/8" UNC



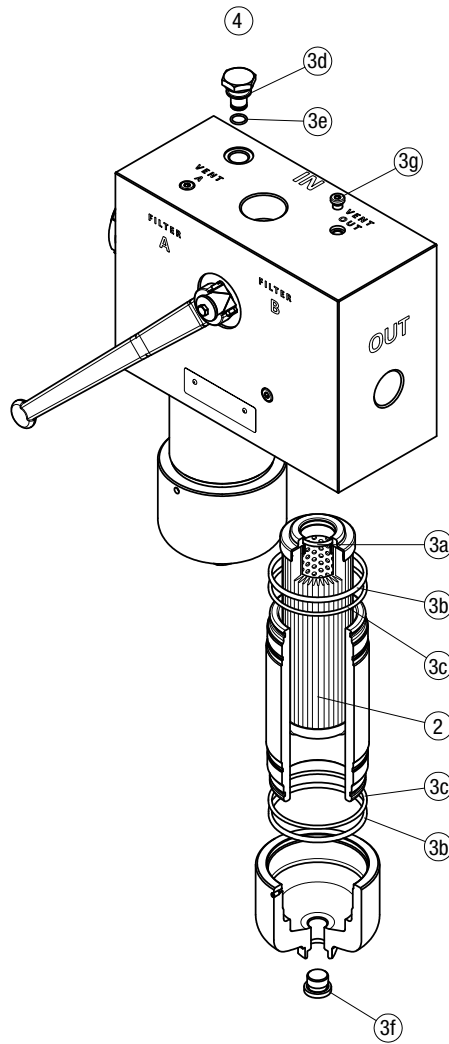
# FHD FHD051 - FHD326 - FHD333

## Dimensions

FHD333	
Length 4	
Connections	R
F1	M10
F2	3/8" UNC



FHD 021 - 051 - 326 - 333



Item:	Q.ty: 1 pc.	Q.ty: 1 pc.		Q.ty: 1 pc.	
Filter series	Filter element	Seal Kit code number		Indicator connection plug	
FHD 021	See order table	NBR	FPM	NBR	FPM
FHD 051		0205011	0205012	T2H	T2V
FHD 326-333		02050420	02050421		
		02050377	02050378		

## DIFFERENTIAL PRESSURE INDICATORS

Series	Configuration example 1:							
<b>DE</b> Electrical differential pressure indicator	DE	M	12	H	F	50	P01	
<b>DL</b> Electrical/Visual differential pressure indicator	Configuration example 2:							
<b>DT</b> Electronic differential pressure indicator	DE	U	50	H	A	50	P01	UL
<b>DV</b> Visual differential pressure indicator	Configuration example 3:							
	DL	E	20	V	A	71	P01	
	Configuration example 4:							
	DT	A	50	H	F	70	P01	
	Configuration example 5:							
	DV	M	70	V			P01	

Type	DE	DL	DT	DV
<b>A</b> Standard type	•	•	•	<b>A</b> With automatic reset
<b>M</b> With wired electrical connection	•	-	-	<b>M</b> With manual reset
<b>U</b> Standard type 210 bar, UL certified	•	-	-	
<b>E</b> For high power supply	-	•	-	

Pressure setting	DEA	DEM	DEU	DLA	DLE	DTA	DVA	DVM
<b>50</b> 5.0 bar	•	•	•	•	•	•	•	•
<b>70</b> 7.0 bar	•	•	•	•	•	•	•	•
<b>95</b> 9.5 bar	•	•	-	•	•	•	•	•

Seals	DEA	DEM	DEU	DLA	DLE	DTA	DVA	DVM
<b>H</b> HNBR	•	•	-	•	•	•	•	•
<b>V</b> FPM	•	•	•	•	•	•	•	•

Thermostat	DEA	DEM	DEU	DLA	DLE	DT
<b>A</b> Without thermostat	•	•	•	•	•	-
<b>F</b> With thermostat	-	•	-	-	•	•

Electrical connections	DEA	DEM	DEU	DLA	DLE	DT
<b>10</b> Connection AMP Superseal series 1.5	-	•	-	-	-	-
<b>20</b> Connection AMP Timer Junior	-	•	-	-	-	-
<b>30</b> Connection Deutsch DT-04-2-P	-	•	-	-	-	-
<b>35</b> Connection Deutsch DT-04-3-P	-	•	-	-	-	-
<b>50</b> Connection EN 175301-803	•	-	•	-	•	-
<b>51</b> Connection EN 175301-803, transparent base with lamps 24 Vdc	-	-	-	•	-	-
<b>52</b> Connection EN 175301-803, transparent base with lamps 110 Vdc	-	-	-	•	-	-
<b>70</b> Connection IEC 61076-2-101 D (M12)	-	-	-	-	-	•
<b>71</b> Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc	-	-	-	•	-	-

Option
<b>P01</b> MP Filtri standard
<b>Pxx</b> Customized

Certifications	DEU	OTHERS
Without	-	•
<b>UL</b> UL certification	•	-

## PLUGS

Series	Configuration example	
<b>T2</b> Plug	T2	H

Seals
<b>H</b> HNBR
<b>V</b> FPM