

## AV and TV

### Application

Alternatively to oil drain plugs at oil tanks you can also insert ARGO-HYTOS oil drain valves of type series AV20 or TV. The oil can precisely be discharged over the drain hole into a container or be sucked off by connected oil pumps or ARGO-HYTOS oil service units. Oil change or oil service is being simplified and can be effected almost without loosing any oil.

Examples for applications: Oil storage tanks in all industries, gear boxes, test benches, axles of rail vehicles.

### Design and function

ARGO-HYTOS oil drain valves consist of a housing with spindle and poppet sealing. The poppet is opened by the spindle and the oil then will be drained. Threads at the oil drain hole allow connection of oil pumps or ARGO-HYTOS oil service units.

### Special design features

- Sealing by precise steel ball
- With Type AV additional sealing of the spindle

### Fixing

At the bottom of the tank by screw connection

### Operating pressure

Max. 1 bar absolute (not applicable with pressurized containers)

### Connection

Threaded port – see Measurements



### Hydraulic fluids

Mineral oil and biodegradable hydraulic fluids (HEES and HETG, see info-sheet 00.20)

### Temperature range of fluids

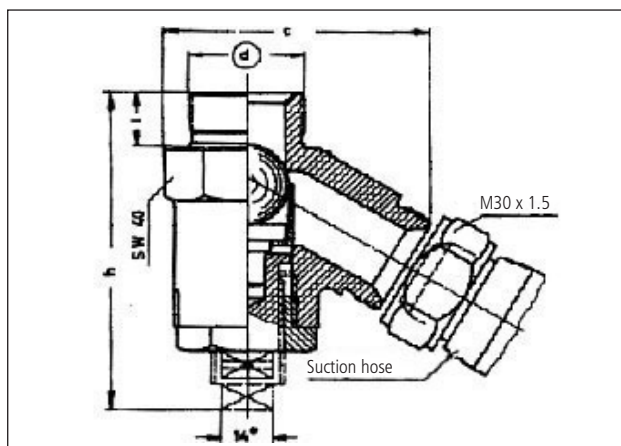
-30 °C ... +100 °C

### Ambient temperature range

-30 °C ... +80 °C

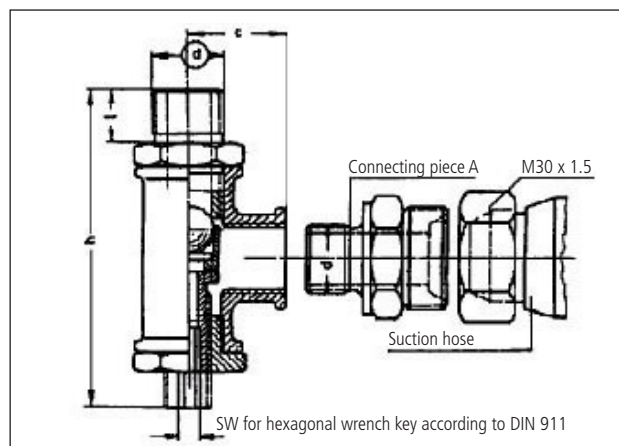
### Materials

Housing: GTW-40 powder-coated  
Spindle and ball: steel  
Operating position: vertical or horizontal



TYPE AV

Type	D	C	H	I	A/F	Part-No.
AV20	M32x1.5	75	93	16	14	EC330400
AV20/1	M30x1.5	75	93	16	14	EC330410



TYPE TV

Type	D	C	H	I	Connection A	A/F	Part-No.
TV R 1/2"	R 1/2"	28	92	15	M30x1.5 to R 1/2"	6	EC330110
TV R 3/4"	R 3/4"	33	102	16	M30x1.5 to R 3/4"	8	EC330120
TV R 1" *	R 1"	38	125	18	M30x1.5 to R 1"	8	EC330130

\* For Type TV R 1" the spindle is additionally sealed with cap nut and flat gasket (not shown in drawing).



### **Oil Level Dipsticks**

**C4.0410 • C4.0412**  
**C4.0421 • C4.0431**  
**C4.0450 • C4.0464**

- With mounting bolts
- Bolt thread M10
- Dipstick length up to 640 mm

## Description

### Application

Controlling the oil level in hydraulic oil or lubricant reservoirs

### Construction and function

ARGO-HYTOS oil level dipsticks are robust semicircular metal rods with an O-ring seal.

A mounting bolt with a suitable hole is supplied with each dipstick.

Dipsticks are available in various lengths, with various markings, and with various mounting bolts (see selection chart).

### Special features

- The robust material withstands even the most severe operating conditions
- The integral O-ring provides a 100% tight seal
- A suitable dipstick mounting bolt can also replace one of the mounting bolts of an in-tank return or suction filter

### Mounting

The bolt supplied with the oil level dipstick is installed either in a separate threaded hole or in an already existing mounting hole for an in-tank filter. This eliminates the need to machine an extra mounting hole.

If used as a filter mounting bolt, care should be taken to provide a proper seal between the tank, the filter and the mounting bolt.

## Selection Chart

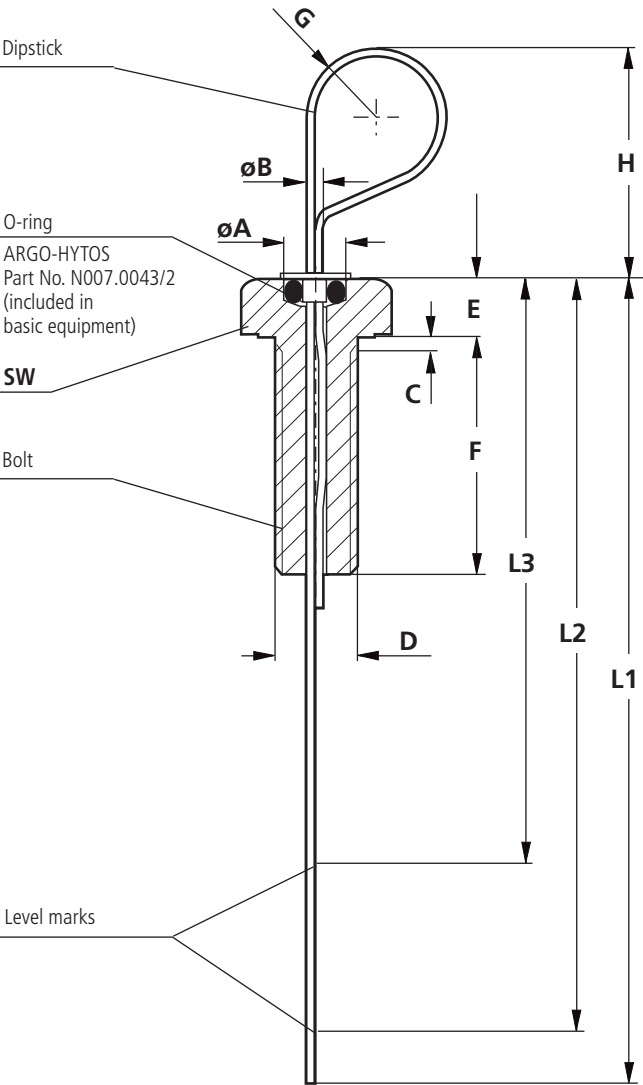
Part No.	Dipstick dimension L1	Dipstick dimension L2	Dipstick dimension L3	Mounting bolt	Grade	Remarks
	mm	mm	mm			
1	2	3	4	5	7	8
C4.0410-00330	100	-	-	SV.2810.05	8.8	-
C4.0410-01330	100	95	64	SV.2810.05	8.8	-
C4.0412-00330	120	-	-	SV.2810.05	8.8	-
C4.0412-03330	120	97	47	SV.2810.05	8.8	-
C4.0412-04330	120	100	75	SV.2810.05	8.8	-
C4.0421-00330	210	-	-	SV.2810.05	8.8	-
C4.0421-04330	210	118	88	SV.2810.05	8.8	-
C4.0421-06330	210	71	46	SV.2810.05	8.8	-
C4.0431-00330	310	-	-	SV.2810.05	8.8	-
C4.0431-01330	310	190	160	SV.2810.05	8.8	-
C4.0450-00330	500	-	-	SV.2810.05	8.8	-
C4.0464-00330	640	-	-	SV.2810.05	8.8	-
C4.0464-01330	640	630	90	SV.2810.05	8.8	-

### Remarks:

The dipsticks listed in the chart are standard dipsticks. If modifications are required, e.g. for the use in pressurized tanks, we kindly ask for your request.

Dimensions

Dipstick with bolt



Dimensions

Bolt	A	B	C	D	E	F	G	H	SW
SV.2810.05	10	3,7	4,5	M10	7	30	10	39	17

## Characteristics

### Operating pressure

Max. 1 bar (abs.)

(Not suitable for use in pressurized hydraulic oil tanks)

### Connection

Threaded ports according to ISO 228 or DIN 13.

Sizes see section Dimensions (other port threads on request)

### Hydraulic fluids

Mineral oil and biodegradable fluids

(HEES and HETG, see info-sheet 00.20)

### Temperature range

- 30 °C ... + 100 °C (temporary + 125 °C)

### Ambient temperature range

- 30 °C ... + 80 °C (temporary + 100 °C)

### Materials

Dipsticks:

Steel, zinc plated

Bolts:

Steel, zinc plated

Seals:

NBR (Viton on request)

### Mounting position

Preferably in vertical position, above the oil level

## Quality Assurance

### Quality management according to DIN EN ISO 9001

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

ARGO-HYTOS GMBH · Industriestraße 9 · D-76703 Kraichtal

Tel: +49 7250 76-0 · Fax: +49 7250 76-199 · [info.de@argo-hytos.com](mailto:info.de@argo-hytos.com) · [www.argo-hytos.com](http://www.argo-hytos.com)



## Oil Level Gauges

**C5.3511 • C5.3516  
C5.3529**

- With thermometer
- Indication range up to 194 mm
- Temperature indication up to 80 °C



Description
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**Application**  
Indicates the oil level and the oil temperature in hydraulic oil or lubricant reservoirs.

ARGO-HYTOS oil level gauges consist of a robust metal housing equipped with a sight level tube and built-in thermometer. The fluid enters the thermometer chamber through the mounting bolts, which are hollow. O-rings provide a seal against the housing and the reservoir wall.

- The robust metal housing is designed to withstand even the most severe operating conditions.
- The integrated scale shows the oil temperature in °C and °F.

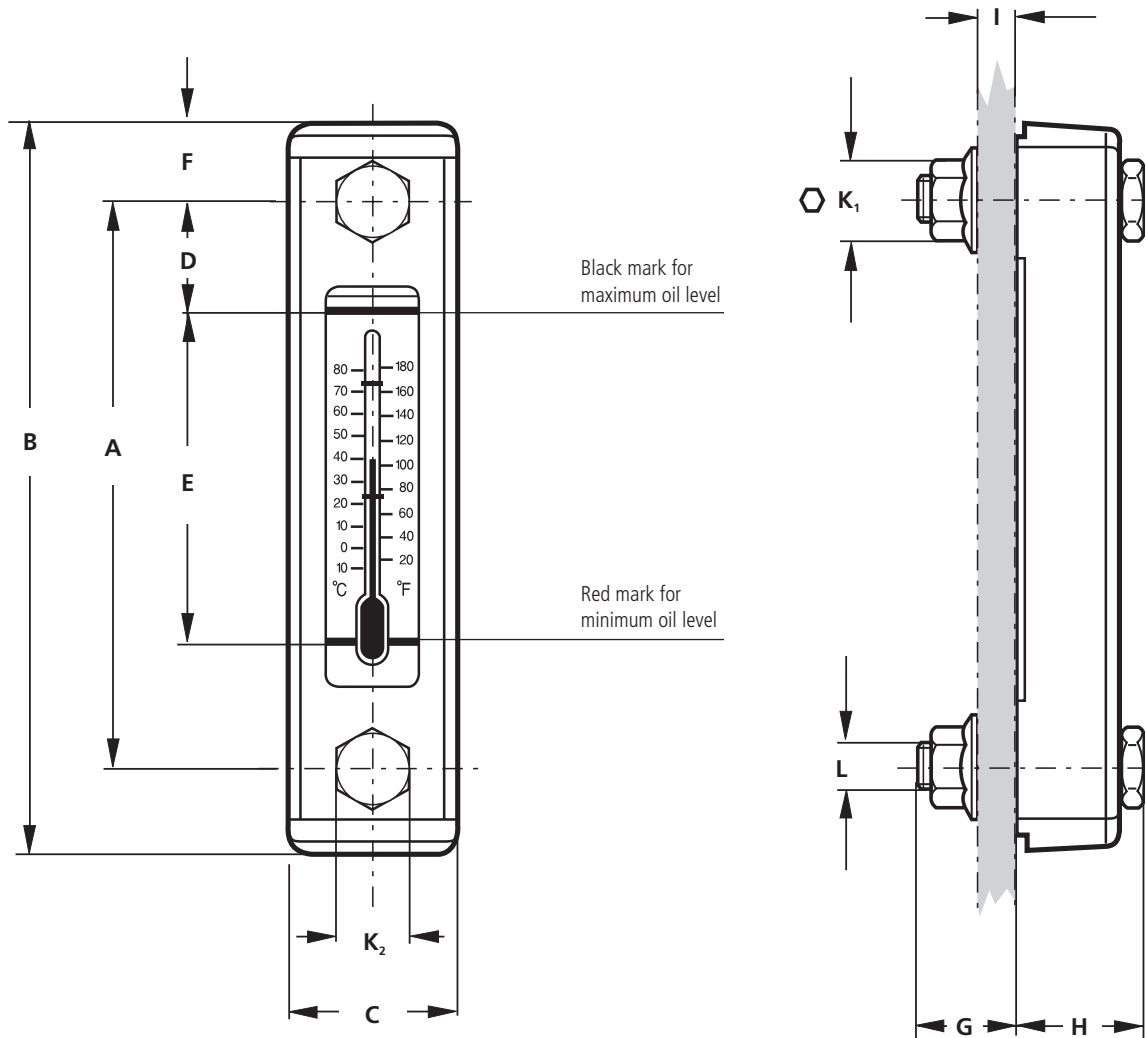
The hollow screws and the locking nuts supplied with the gauge, enable installation on the reservoir wall by using two bores.  
The locking nuts serve the purpose of retightening the bolts from the outside (assembly torque: 8 Nm).  
Threaded holes are required instead of smooth bore holes if the wall of the reservoir is more than 8 mm thick.

## Selection Chart

[illegible]

The gauges listed in the chart are standard gauges. If modifications are required, we kindly ask for your request.

## Dimensions



At the housing C5.3529-50 the vision panel is splitted in two sections.

## Measurements

Type	A	B	C	D	E	F	G	H	I max.	K <sub>1</sub>	K <sub>2</sub>	L
C5.3511-50	76	108	34,5	22,5	33	16	18	29	8	17	17	M10
C5.3516-50	127	159	34,5	26,5	74	16	18	29	8	18	17	M12
C5.3529-50	254	285	34,5	28	194	16	18	29	8	18	17	M12



## Characteristics

### Operating pressure

Max. 2 bar (abs.)

### Connection

Threaded ports according to DIN 13. Sizes see Selection Chart, column 6 and section Dimensions

### Hydraulic fluids

Mineral oil and biodegradable fluids (HEES and HETG, see info-sheet 00.20)

### Temperature range

- 20 °C ... + 80 °C

### Ambient temperature range

- 25 °C ... + 80 °C

### Materials

Housing:	Steel, powder coated, black
Sight level tube:	Polyamide
Scale:	Aluminium
Thermometer:	Glass
Bolts:	Steel, zinc plated
Seals:	NBR (Viton on request)

### Mounting position

In the min./max. oil level range on the side wall of the hydraulic oil reservoir.

## Quality Assurance

### Quality management according to DIN EN ISO 9001

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.

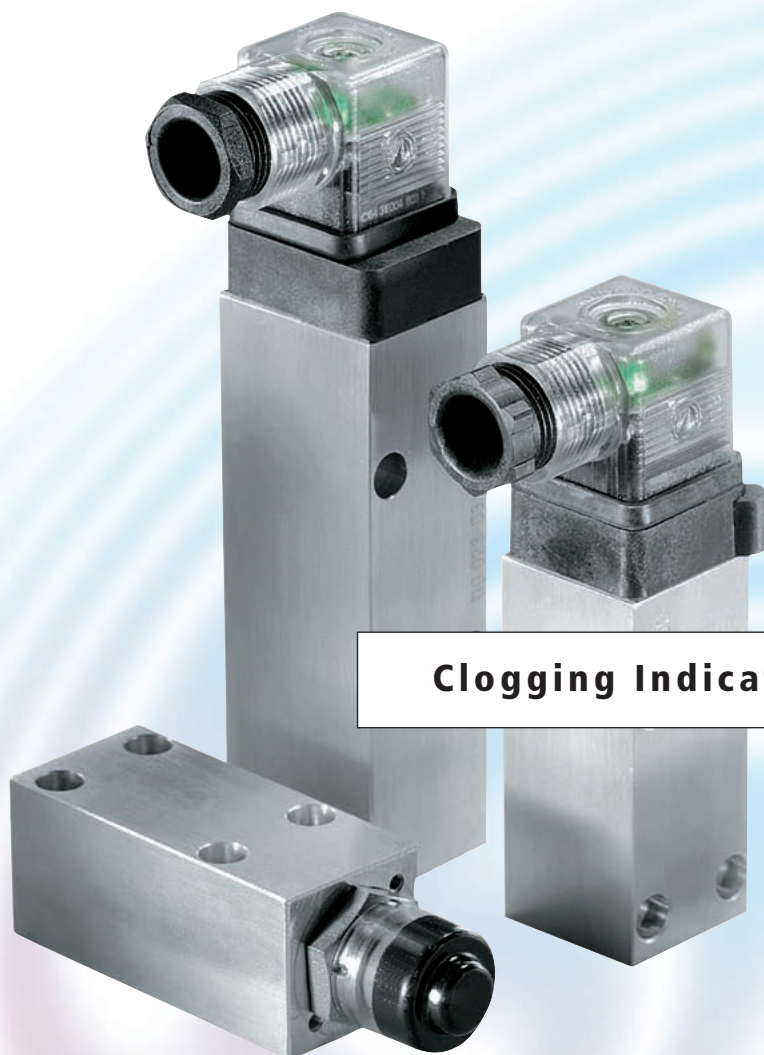
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Tel: +49 7250 76-0 · Fax: +49 7250 76-199 · [info.de@argo-hytos.com](mailto:info.de@argo-hytos.com) · [www.argo-hytos.com](http://www.argo-hytos.com)



### **Clogging Indicators**

**DG 023 • DG 024 • DG 025  
DG 041 • DG 042**

- For Pressure and High Pressure Filters
- Operating pressure up to 450 bar
- Response/Switching pressure up to 5,0 bar

## Description

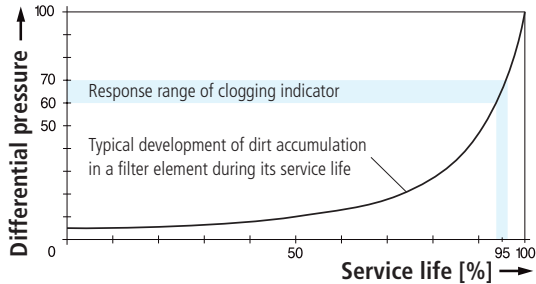
### Application

Monitoring the contamination of pressure and high pressure filters.

### General

Filter elements installed in hydraulic filters remove dirt from a hydraulic system and therefore become contaminated themselves.

Free pores or spaces in the filter material are obstructed by dirt particles, which causes a continuous increase in the initial pressure loss.



The dirt load collected in a filter element gradually increases during service, which also leads to a higher pressure drop. The resulting differential pressure  $\Delta p$  is monitored by a clogging indicator. Once a preset value is reached, an electrical and/or optical signal is generated.

The following must be observed in this context:

The pressure drop caused by the filter element increases depending on the flow rate, the dirt load, and the viscosity of the pressure fluid.

Therefore, a filter element is not regarded contaminated before the clogging indicator responds at operating temperature of the hydraulic system, causing a continuous signal.

### Consequences of an overdue filter element change

For filters equipped

with a bypass valve: The more dirt has collected in the filter element, the more frequently the bypass valve opens and part of the hydraulic fluid remains unfiltered. The high pressure loss causes unnecessary power consumption.

For filters without

a bypass valve:

The increasing pressure loss across the filter element, which reduces the efficiency of the hydraulic system, eventually causes malfunctions to occur or a pressure relief valve to respond.

### Design and principle of operation

Within the clogging indicator, the differential pressure  $\Delta p = p_1 - p_2$  (pressure upstream of the element minus pressure downstream of the element) caused by the filter element acts on a magnetic piston against the force of a spring.

In optical (mechanical) clogging indicators, the increasing differential pressure causes the piston to approach a second magnet with reversed polarity which in turn causes the indicator to change from green to red. In electrical clogging indicators, the magnetic piston triggers a reed switch.

### Special design features

Piston seal:

The piston actuated by the differential pressure is equipped with a leak-free O-ring seal. As a result, the total flow passes the filter element.

Proximity

position sensing:

Piston movement is detected by sensing a magnetic field, i.e. without mechanical contact. For this reason, ARGO-HYTOS clogging indicators are absolutely leak-free.

## Characteristics

### Operating pressure

0 ... 315 bar, min.  $10^7$  pressure cycles  
Nominal pressure according to DIN 24550

0 ... 450 bar, min.  $10^4$  pressure cycles  
Quasi-static operating pressure

### Connection

For the flange hole layout please refer to the section Dimensions (other fittings on request)

### Hydraulic fluids

Mineral oil and biodegradable fluids  
(HEES and HETG, see info-sheet 00.20)

### Temperature range of fluids

- 30 °C ... + 100 °C (short term + 120 °C)

### Ambient temperature range

- 30 °C ... + 80 °C

### Materials

- Housing: Aluminium alloy
- Piston: Brass
- Socket: Polyamide
- Display piece DG 042: Polyamide
- Seals: NBR (Viton on request)

### Operating voltage

10 ... 30 V DC  
(only required for clogging indicators with built-in LEDs)

### Electrical service life

Min.  $10^7$  switching cycles

### Electrical protection

IP 65 (with mounted and secured socket)

### Mounting position

No limitation

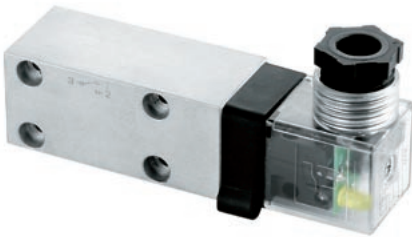
## Overview of types

### DG 042 - Optical differential pressure indicator



**Function:** When the preset differential pressure is reached, the optical indicator changes from green to red. If the pressure differential returns to a value below the preset limit, the indicator changes back to green, i.e. no manual reset of the indicator is required.

### DG 041 - Electrical differential pressure switch (change-over)



**Function:** When the preset differential pressure is reached, the built-in Reed switch changes over.

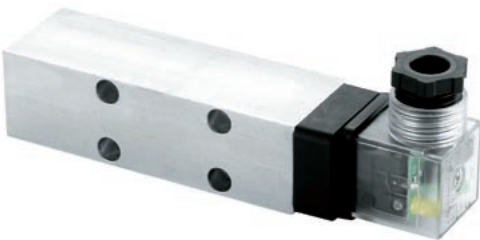
**Option:** The change-over switch makes it possible to indicate a broken wire by means of a suitable electronic circuit, as compared to a make contact switch.

The transparent socket with 2 built-in LEDs makes it possible to have an additional optical indication of the filter contamination.

When the operating voltage is switched on, a green LED lights up.

When the switching pressure is reached, a yellow LED lights up in addition.

### DG 023 - Electrical differential pressure switch with temperature suppression (change-over)

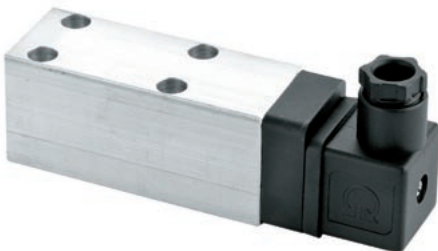


**Function:** The built-in Reed switch changes over when the preset differential pressure is exceeded.

If the temperature drops below 32 °C, a temperature switch opens and suppresses the signal of the differential pressure switch.

The transparent socket with 2 built-in LEDs makes it possible to have an additional optical indication of the filter contamination (function described at DG 041).

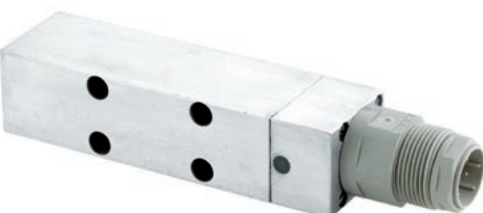
### DG 024 - Electrical differential pressure switch with 2 switching points (break)



**Function:** When 70% of the preset differential pressure is reached, the first Reed switch opens, at 100% the second built-in Reed switch opens.

**Note:** Since the differential pressure of a filter element rises at an exponential rate towards the end of the element's service life (refer to the Description section), approximately 95% of the service life has expired when the first Reed contact opens (at 70% of  $\Delta p$  setting).

### DG 025 - Electrical differential pressure switch with 2 switching points with/without temperature suppression (change-over)



**Function:** Upon reaching 60% and 100% of the preset differential pressure, the two built-in Reed switches change over.

**Option:** In order to suppress the signal at temperatures < 32 °C, a temperature-compensated version of the differential pressure switch is also available.

**Accessory:** For an additional optical indication of the filter contamination, a socket with 3 built-in LEDs is available with part no. DG 025.2601. When the operating voltage is switched on, a green LED lights up. Upon reaching the first switching pressure, a yellow LED lights up in addition.

Exceeding the 2nd switching pressure causes an extra red LED to light up.

**Note:** Refer to DG 024.

## Selection Chart

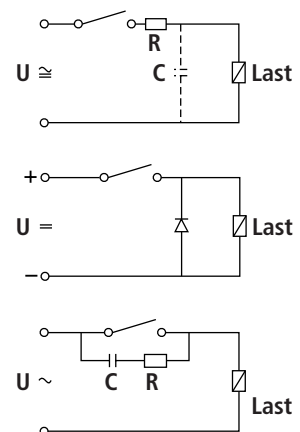
Part No.	Optical indicator	Electrical switch	Temp-suppression < 32° C S <sub>1</sub>	Response/Switching pressure S <sub>2</sub> /S <sub>3</sub>	Type of contact	Switching voltage U	Switching current I	Switching power P	Symbol	Weight	Remarks
1	2	3	4	5	6	7	8	9	10	11	12
DG 042-01	•	-	-	2,0	-	-	-	-	1	0,17	-
DG 042-02	•	-	-	5,0	-	-	-	-	1	0,17	-
DG 041-61	-	•	-	1,2	change-over	120/175	0,17/0,25	3,5/5,0	2	0,19	with socket
DG 041-31	-	•	-	2,0	change-over	120/175	0,17/0,25	3,5/5,0	2	0,19	with socket
DG 041-44	•	•	-	2,0	change-over	- /30	- /0,25	- /3,0	3	0,19	with socket
DG 041-32	-	•	-	2,5	change-over	120/175	0,17/0,25	3,5/5,0	2	0,19	with socket
DG 041-33	-	•	-	5,0	change-over	120/175	0,17/0,25	3,5/5,0	2	0,19	with socket
DG 041-43	•	•	-	5,0	change-over	- /30	- /0,25	- /3,0	3	0,19	with socket
DG 023-03	•	•	•	2,0	change-over	- /30	- /0,25	- /3,0	4	0,34	with socket
DG 023-02	•	•	•	5,0	change-over	- /30	- /0,25	- /3,0	4	0,34	with socket
DG 024-02	-	•	-	3,5/5,0	break	120/175	0,17/0,25	3,5/5,0	5	0,27	with socket
DG 025-05	-	•	-	3,0/5,0	change-over	120/175	0,17/0,25	3,5/5,0	6	0,31	without socket
DG 025-06	-	•	•	3,0/5,0	change-over	120/175	0,17/0,25	3,5/5,0	7	0,38	without socket

### Remarks:

- The response/switching pressure of the clogging indicator must be lower than the cracking pressure of the bypass valve of the filter.
- The clogging indicators listed in this chart are standard units. Other designs available on request.
- Reed switches are sensitive of excessively strong currents. Even a short-term overload causes an increased contact resistance or failure of the switch. By taking the following precautions, premature failure of Reed switches due to overload is avoided.

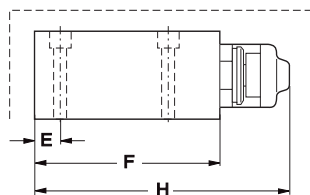
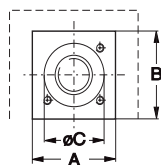
### Wiring suggestions:

- Current limiter for DC and AC voltage:**  
If light bulbs or other loads are connected over long distances (conductor capacity!), a protective resistor should be connected in series in order to limit the current.  
The same applies when capacitance loads are connected.
- Spark suppression in DC applications:**  
The contacts of Reed switches open extremely fast, causing voltage peaks to be induced when switching off inductive loads, such as relays, lifting magnets, or solenoid valves. The resulting self-induction currents are short-circuited by connecting a diode in parallel to the inductive load.
- Spark suppression in AC applications:**  
In AC applications, a diode connected in parallel to the load is not sufficient. RC elements should be used here, connected in parallel to the Reed switch. Please contact our design engineers for advice in order to select a suitable RC element.

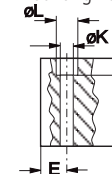


## Dimensions

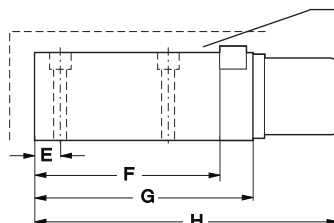
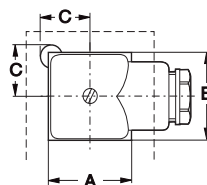
DG 042



Mounting holes

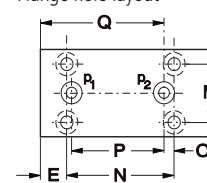


DG 041

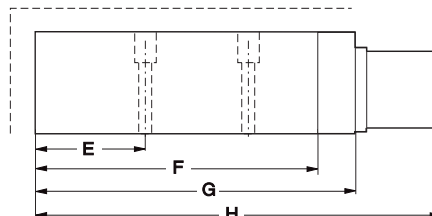
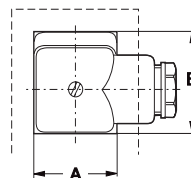


Minimum distance  
from ferromagnetic  
parts: 7 mm

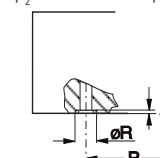
Flange hole layout



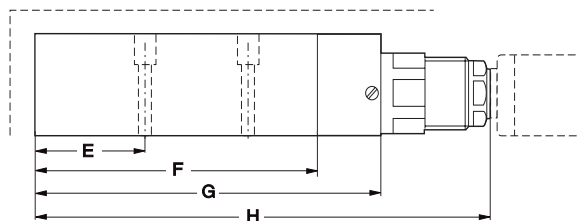
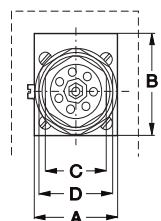
DG 023 / DG 024



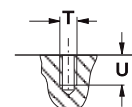
Holes  $p_1$  /  $p_2$   
 $p_1$  = Higher static pressure  
 $p_2$  = Lower static pressure



DG 025



Recommended threads for  
mounting on the mating  
surface



## Measurements

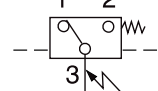
Type	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q	R	S	T	U
DG 042	30	30	21,5	-	8	67	-	93	6	4,5	8	20	39	3	34	44	7,2	1,1	M4	6
DG 041	30	30	17,5	-	8	67	80	110	6	4,5	8	20	39	3	34	44	7,2	1,1	M4	6
DG 023	30	35	-	-	38	102	114	147	11	4,5	8	20	39	3	34	74	7,2	1,1	M4	6
DG 024	30	35	-	-	9	77	89	122	11	4,5	8	20	39	3	34	45	7,2	1,1	M4	6
DG 025-05	30	35	22	27	9	77	100	139	11	4,5	8	20	39	3	34	45	7,2	1,1	M4	6
DG 025-06	30	35	22	27	38	102	125	165	11	4,5	8	20	39	3	34	74	7,2	1,1	M4	6

## Symbols

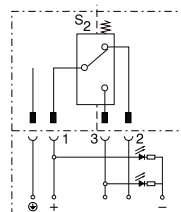
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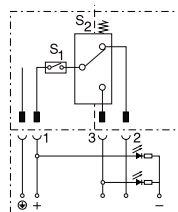
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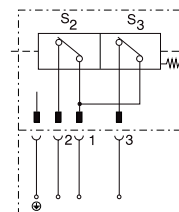
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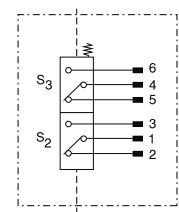
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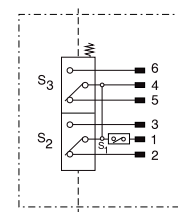
5



6

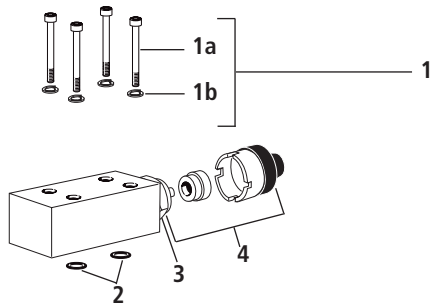


7

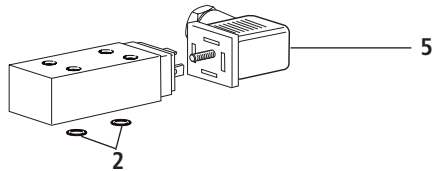


## Spare Parts

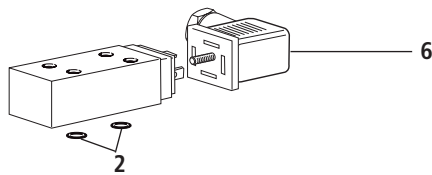
DG 042



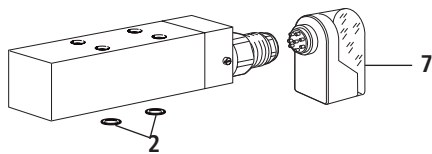
DG 041 / DG 024



DG 041 / DG 023



DG 025



Pos.	Designation	Part No.
<b>1</b>	Mounting accessories *	DG 020.1710
<b>1a</b>	Bolt * M4 x 30 DIN 912-8.8	3302001
<b>1b</b>	Spring washer * B4 DIN 127	3315001
<b>2</b>	O-ring 4,5 x 1,5	N 007.0041
<b>3</b>	O-ring 12,3 x 2,4	N 007.0124
<b>4</b>	Display piece assy	DG 042.1410
<b>5</b>	Socket DIN 43650 - AF3	DG 041.1220
<b>6</b>	Socket with 2 LED DIN 43650 - AF3	DG 041.1200
<b>7</b>	Socket with 3 LED *	DG 025.2601
	DIN 43651	

\*Not included in basic unit

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.

## Qualitätssicherung

Quality management according to DIN EN ISO 9001

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

ARGO-HYTOS GMBH · Industriestraße 9 · D-76703 Kraichtal

Tel: +49 7250 76-0 · Fax: +49 7250 76-199 · info.de@argo-hytos.com · www.argo-hytos.com





## Clogging Indicators

**DG 100 • DG 101 • DG 200  
DG 813 • DG 815 • DG 902**

- For Return or Suction Filters
- Connection G $\frac{1}{4}$  resp. M12 x 1,5
- Response/Switching pressure up to 2,5 bar

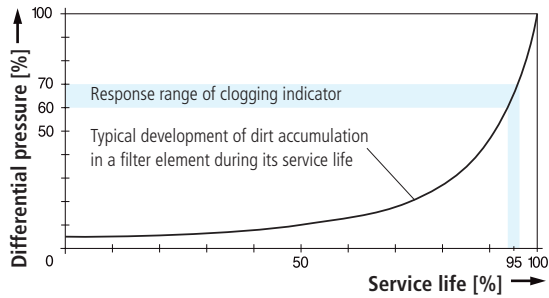
## Description

### Application

Monitoring the contamination of suction resp. return filters.

### General

Filter elements installed in hydraulic filters remove dirt from a hydraulic system and therefore become contaminated themselves. Free pores or spaces in the filter material are obstructed by dirt particles, which causes a continuous increase in the initial pressure loss.



The dirt load collected in a filter element gradually increases during service, which also leads to a higher pressure drop. The resulting vacuum or back pressure is monitored by a clogging indicator. Once a preset value is reached, an electrical and/or optical signal is generated.

The following must be observed in this context:

The pressure drop caused by the filter element increases depending on the flow rate, the dirt load, and the viscosity of the pressure fluid. Therefore, a filter element is not regarded contaminated before the clogging indicator responds at operating temperature of the hydraulic system, causing a continuous signal.

### Consequences of an overdue filter element change

Filters with

by-pass valve:

The more dirt has collected in the filter element, the more frequently the bypass valve opens and part of the hydraulic fluid remains unfiltered. The high pressure drop causes unnecessary power consumption.

Suction filters with-

out by-pass valve:

There is a high risk of pump cavitation with increasing vacuum caused by contaminated elements.

## Characteristics

### Operating pressure

- DG 100: - 1,0 ... + 0,25 bar
- DG 101: - 1,0 ... + 0,25 bar
- DG 902: - 0,5 ... + 1,0 bar
- DG 200: 0 ... + 10,0 bar
- DG 813: 0 ... + 10,0 bar
- DG 815: 0 ... + 10,0 bar

### Connection

Threaded ports according to ISO 228 or DIN 13.

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

### Hydraulic fluids

Mineral oil and biodegradable fluids  
(HEES and HETG, see info-sheet 00.20)

### Temperature range of fluids

- DG 100: - 30 °C ... + 100 °C (short term 120 °C)
- DG 101: - 30 °C ... + 100 °C (short term 120 °C)
- DG 902: - 15 °C ... + 100 °C (short term 130 °C)
- DG 200: - 20 °C ... + 90 °C
- DG 813: - 30 °C ... + 100 °C (short term 120 °C)
- DG 815: - 30 °C ... + 100 °C (short term 120 °C)

### Ambient temperature range

- DG 100: - 30 °C ... + 80 °C
- DG 101: - 30 °C ... + 80 °C
- DG 902: - 30 °C ... + 80 °C\*
- DG 200: - 20 °C ... + 90 °C
- DG 813: - 30 °C ... + 80 °C
- DG 815: - 30 °C ... + 80 °C

\* Reduced switching accuracy in the temperature range - 30 °C ... - 15 °C owing to the principle of operation!

### Materials

- DG 100: Housing steel, fitting brass, seal copper
- DG 101: Housing steel, fitting brass, seal copper
- DG 902: Housing brass, protection cap polyamide, diaphragm FPM, seal NBR
- DG 200: Housing polyamide, fitting brass, seal PTFE
- DG 813: Housing steel galvanized, protection cap NBR, diaphragm NBR, seal copper
- DG 815: Housing polyamide, fitting steel galvanized, diaphragm NBR, seal copper

### Operating voltage

10 ... 30 V DC

(only required for clogging indicators with built-in LEDs)

### Electrical service life

- DG 902: min. 106 switching cycles
- DG 813: min. 106 switching cycles
- DG 815: min. 107 switching cycles

### Electrical protection

- DG 902: IP 44 (with protection cap)
- DG 813: IP 65 (with protection cap)
- DG 815: IP 65 (with mounted and secured socket)

### Electrical connection

- DG 902: Flat plugs DIN 46247 - 6,3 x 1  
Cable diameter approx. 6,5 mm
- DG 813: Flat plugs DIN 46244 - A 6,3 - 0,8  
Cable diameter approx. 4 mm
- DG 815: Socket DIN 43650 - AF3  
Cable diameter 6 ... 8 mm

### Mounting position

No limitation

## Overview of types

### DG 100 / DG 101 - Manometer for Suction Filters



- Function:** Manometer for optical monitoring of the dirt load in suction filters.  
Green reading area = filter element O.K.,  
Red reading area = filter element clogged.
- Option:** Bottom-mounted fitting, making it possible to turn the manometer into the direction from which it is viewed, as compared to a fitting mounted on the back (standard).

### DG 902 - Vacuum Switch for Suction Filters (change-over)



- Function:** When the preset vacuum is reached, the built-in diaphragm switch changes over.  
The change-over switch makes it possible to indicate a broken wire by means of a suitable electronic circuit, as compared to a make contact switch.

### DG 200 - Manometer for Return Filters



- Function:** Manometer for optical monitoring of the dirt load in return filters.  
Green reading area = filter element O.K.,  
Red reading area = filter element clogged.  
In order to protect the measuring element from pressure peaks, the unit is provided with a built-in orifice system.
- Option:** Bottom-mounted fitting, making it possible to turn the manometer into the direction from which it is viewed, as compared to a fitting mounted on the back (standard).

### DG 813 - Pressure Switch for Return Filters (make/break)



- Function:** The diaphragm switch closes resp. opens as soon as the pressure exceeds the preset value.
- Accessories:** Suitable protection caps are available under part no.  
DG 813.0701 (central hole for cable  $\varnothing$  1,5 up to 5 mm) and  
DG 813.0702 (2 holes for cable  $\varnothing$  1,7 up to 2,2 mm).

### DG 815 - Pressure Switch for Return Filters (change-over)



- Function:** When the preset back pressure is reached, the built-in diaphragm switch changes over.  
The change-over switch makes it possible to indicate a broken wire by means of a suitable electronic circuit, as compared to a make contact switch.
- Option:** The transparent socket with 2 built-in LEDs makes it possible to have an additional optical indication of the element contamination.  
When the operating voltage is switched on, a green LED lights up.  
When the switching pressure is reached, a yellow LED lights up in addition.

## Selection Chart

Part No.	Optical indicator	Electrical switch	Temp. suppression < +32° C	Response/Switching pressure	Type of contact	Switching voltage U	Switching current I	Switching power P	Symbol	Weight	Remarks
				bar		V AC/DC	A AC/DC	VA/W AC/DC		kg	
1	2	3	4	5	6	7	8	9	10	11	12
DG 100-00	•	-	-	-0,25	-	-	-	-	1	0,11	Fitting on the back
DG 101-04	•	-	-	-0,25	-	-	-	-	1	0,11	Bottom fitting
DG 902-11	-	•	-	-0,15	change-over	250/24	6,0/2,0	1500/48	2	0,13	with protection cap
DG 902-12	-	•	-	-0,25	change-over	250/24	6,0/2,0	1500/48	2	0,13	with protection cap
DG 200-05	•	-	-	+1,0	-	-	-	-	1	0,07	Fitting on the back
DG 200-11 <sup>1</sup>	•	-	-	+1,0	-	-	-	-	1	0,07	Fitting on the back
DG 200-06	•	-	-	+2,0	-	-	-	-	1	0,07	Fitting on the back
DG 200-15 <sup>1</sup>	•	-	-	+2,0	-	-	-	-	1	0,07	Fitting on the back
DG 200-16 <sup>2</sup>	•	-	-	+2,0	-	-	-	-	1	0,07	Fitting on the back
DG 200-10	•	-	-	+2,0	-	-	-	-	1	0,07	Fitting on the back
DG 813-00	-	•	-	+1,2	make	42/42	4,0/4,0	100/100	3	0,07	without protection cap
DG 813-03	-	•	-	+1,5	make	42/42	4,0/4,0	100/100	3	0,07	without protection cap
DG 813-01	-	•	-	+2,0	make	42/42	4,0/4,0	100/100	3	0,07	without protection cap
DG 813-05	-	•	-	+2,5	make	42/42	4,0/4,0	100/100	3	0,07	without protection cap
DG 813-20	-	•	-	+1,2	break	42/42	4,0/4,0	100/100	4	0,07	without protection cap
DG 813-21	-	•	-	+2,0	break	42/42	4,0/4,0	100/100	4	0,07	without protection cap
DG 815-01	-	•	-	+1,2	change-over	250/30	4,0/4,0	250/60	5	0,13	-
DG 815-11	•	•	-	+1,2	change-over	-/30	-/0,25	-/3,0	6	0,13	-
DG 815-02	-	•	-	+2,0	change-over	250/30	4,0/4,0	250/60	5	0,13	-
DG 815-12	•	•	-	+2,0	change-over	-/30	-/0,25	-/3,0	6	0,13	-

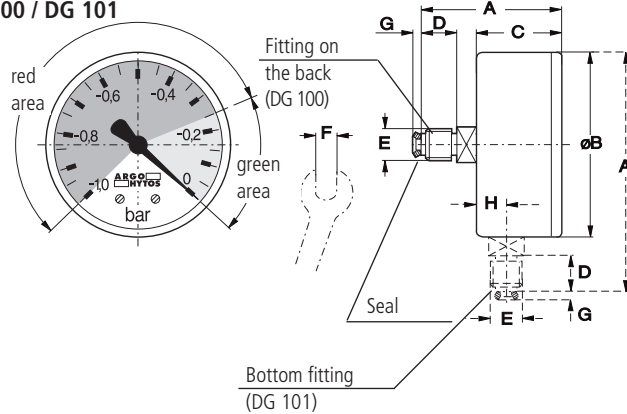
### Remarks:

- With return filters, the response/switching pressure of the clogging indicator used must be lower than the cracking pressure of the bypass valve, with suction filters it must be higher.
- The clogging indicators listed in this chart are standard units. Other designs available on request.

<sup>1</sup> for FR 043 / FR 072 (with preformed seals)    <sup>2</sup> for FNA 008/FNA 016 (as DG 200-06 but without throttle screw )

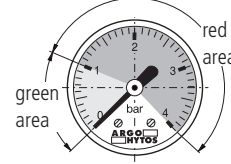
## Dimensions

DG 100 / DG 101

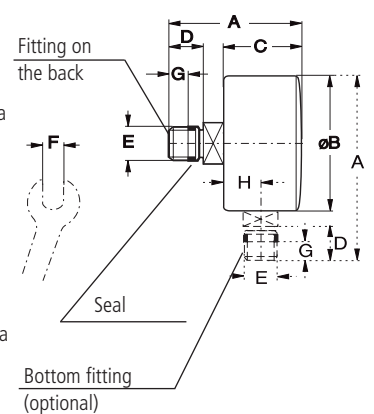
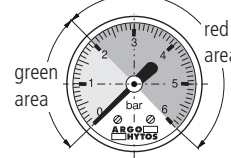


DG 200

Response pressure 1,0 bar

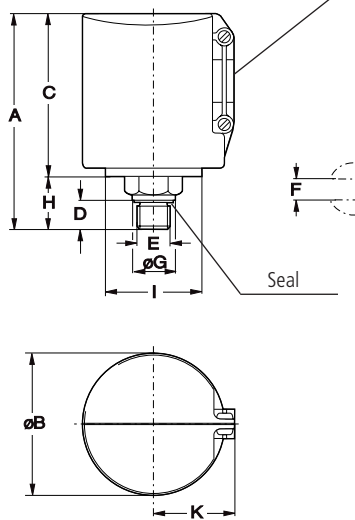


Response pressure 2,0 bar



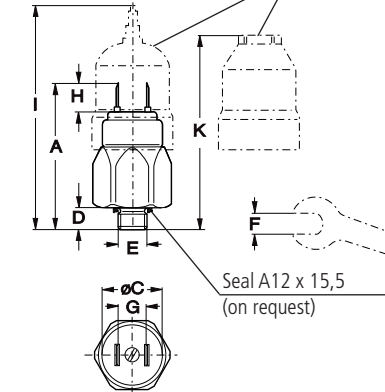
DG 902

Cable hole - Ø approx. 6,5 mm  
Clamping bead for strain relief

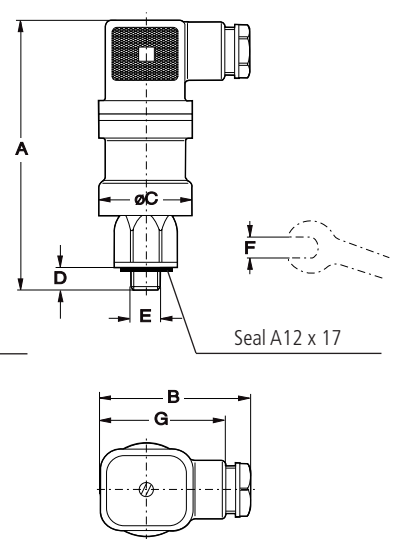


DG 813

Protection caps  
(on request)



DG 815



## Measurements

Type	A	B	C	D	E	F	G	H	I	K
DG 100 / 101*	50 / 84*	64	30	13	G $\frac{1}{4}$	14	3,2	10*	-	-
DG 902	76	50	56	10	G $\frac{1}{4}$	21	18,5	20	34	30
DG 200	47 / 59*	41	26 / 24*	12	M12 x 1,5	14 / 12*	5	9*	-	-
DG 813	55	23,3	24	9	M12 x 1,5	24	13	9	88	74
DG 815	92	50	34	9	M12 x 1,5	27	40	-	-	-

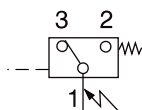
\* Bottom fitting

## Symbols

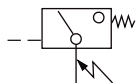
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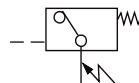
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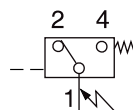
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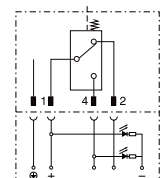
4



5

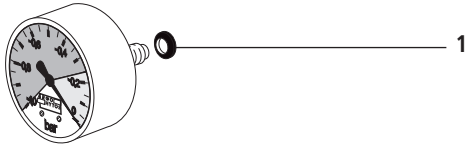


6

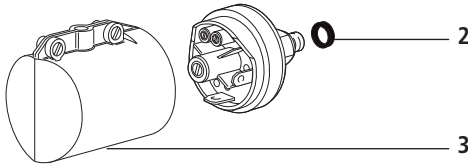


## Spare Parts

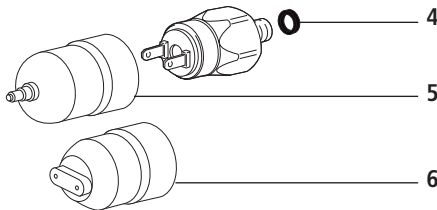
DG 100  
DG 101



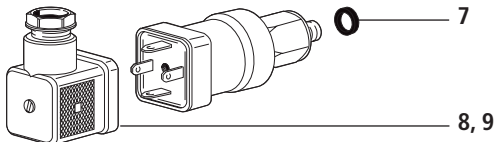
DG 902



DG 813



DG 815



Pos.	Designation	Part No.
1	Seal	DG 100.0101
2	Seal	DG 902.0103
3	Protection cap	DG 902.1701
4	Seal * A12 x 15,5 DIN 7603-Cu	3331066
5	Protection cap *	DG 813.0701
6	Protection cap *	DG 813.0702
7	Seal A12 x 17 DIN 7603-Cu	3331069
8	Socket DIN 43650 - AF3	DG 041.1220
9	Socket with 2 LED DIN 43650 - AF3	DG 041.1200

\*Not included in basic unit

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

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.

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ARGO-HYTOS GMBH · Industriestraße 9 · D-76703 Kraichtal

Tel: +49 7250 76-0 · Fax: +49 7250 76-199 · info.de@argo-hytos.com · www.argo-hytos.com





### Ventilating Filters



**L1.0406 • L1.0506**

**L1.0706 • L1.0807**

- Connection up to M60 x 2
- Nominal flow rate up to 850 l/min



## Description

### Application

Ventilation of tanks for hydraulic and lubrication systems, and gearboxes.

### General

The oil levels in the tanks of hydraulic systems are subject to continuous variation due to temperature changes and the operation of cylinders and pressure vessels.

In order to prevent over pressure in the tanks, an exchange of air with the external atmosphere is necessary. By the use of a ventilating filter, the outside air that is drawn in is filtered and the ingress of dust is therefore prevented.

### Special features

The ventilation openings are designed that dust on the surface of the tank is not drawn in, and that the ingress of spray and rainwater is largely prevented.

The use in marine applications presents no problem due to the use of synthetic materials and stainless steel.

### Design

Flow direction bi-directional (air IN/OUT). The star-shaped pleating of the filter material results in:

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

### Ordering options / versions

Integrated oil-level dipstick (for all types):

A dipstick can be integrated in the ventilating filter for checking the oil level. Therefore, a separate dipstick or an additional opening in the tank is not required.

Oil separator (L1.0406):

An effective protection against splashing oil in mobile operation.

Double check valves (L1.0506, L1.0807):

By the use of double check valves, the exchange of air between the tank and the environment can be considerably reduced, whereby the ingress of dust is minimized and the lifetime of the air filter element can be increased. With the double check valve, an over-pressure can be created in the tank in order to improve the suction conditions for the pumps.

A further advantage is the reduction of spray water entry and the loss of oil through the ventilating filter.

Vandalism proof types:

Ventilating filters in patented vandalism proof version, please see catalogue sheet 50.20.

Filling and ventilating filters in standard or patented vandalism proof version, see catalogue sheet 50.30.

### Maintenance

Ventilating filters should be changed at least every 1000 operating hours, or at minimum once a year.

## Characteristics

### Nominal flow rate

Up to 850 l/min (see Selection Chart, column 2)

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

- Ventilating filters without double check valve:  
 $\Delta p < 0,03 \text{ bar}$
- Ventilating filters with double check valve:  
 $\Delta p < 0,1 \text{ bar}$  for air IN

### Connection

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

### Filter fineness

2  $\mu\text{m}$

Tested in a single pass test with ISO MTD

### Hydraulic fluids

Mineral oil and biodegradable fluids  
(HEES u. HETG, see info sheet 00.20)

### Temperature range hydraulic fluid

- 30 °C ... + 100 °C

### Temperature range environment

- 30 °C ... + 100 °C

### Materials

Cap:	Polyamide, GF reinforced (L1.0506 Polyester, GK reinforced)
Base:	Polyamide, GF reinforced (L1.0506 Polyester, GK filled)
Dipstick:	Stainless steel (1.4301)
Gaskets:	NBR (Viton on request)
Filter media:	Composite, multi-layer

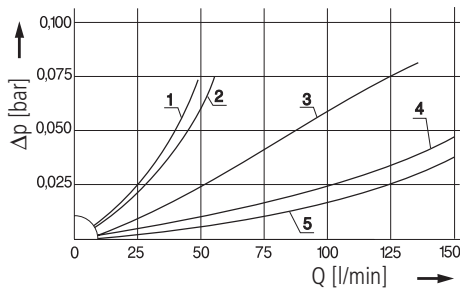
### Mounting position

No limitation, position on the tank see section Layout

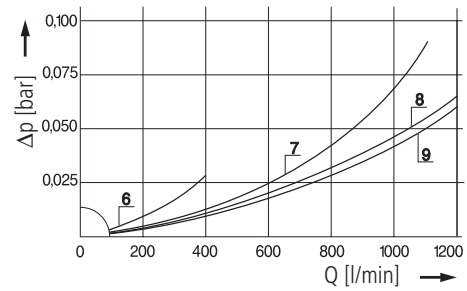
## Diagrams

### $\Delta p$ -curves for complete filters in Selection Chart, column 2

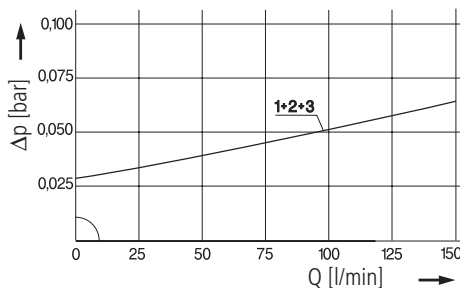
**D1** Pressure drop as a function of the **flow volume**  
**Air IN/OUT**



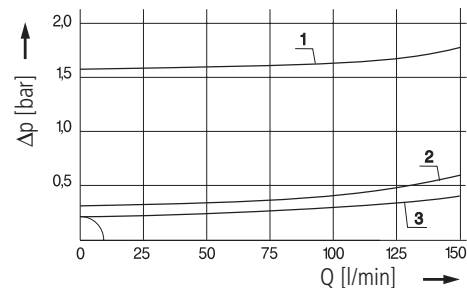
Pressure drop as a function of the **flow volume**  
**Air IN/OUT**



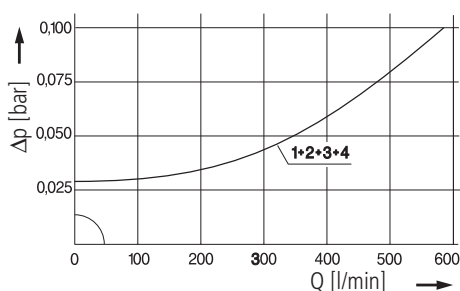
**D2** Pressure drop as a function of the **flow volume**  
**Air IN**



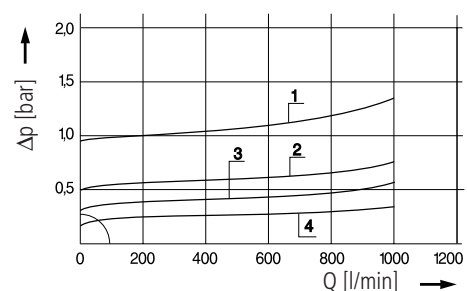
Pressure drop as a function of the **flow volume**  
**Air OUT**



**D3** Pressure drop as a function of the **flow volume**  
**Air IN**

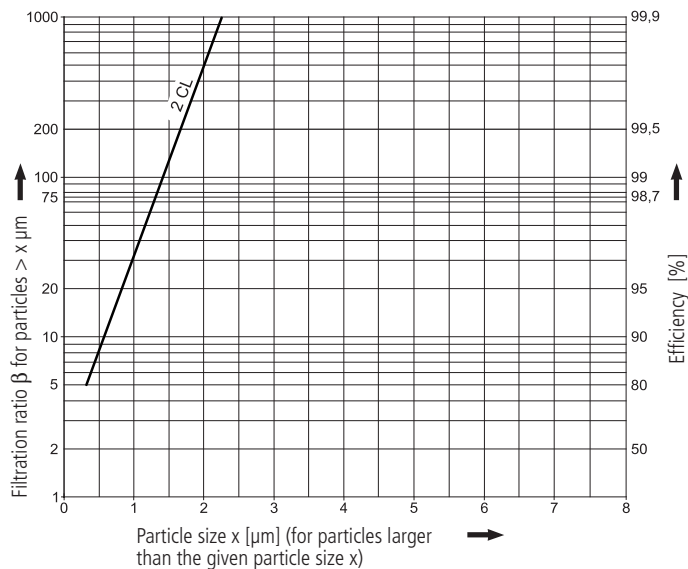


Pressure drop as a function of the **flow volume**  
**Air OUT**



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

**Dx** Filtration ratio  $\beta$  as a function of particle size  $x$  tested in a single pass test with ISO MTD



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

**2 CL** = 2  $\mu$ m Composite  
99,5 % efficiency for particles of size 2  $\mu$ m  
tested in a single pass test with ISO MTD

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

## Selection Chart

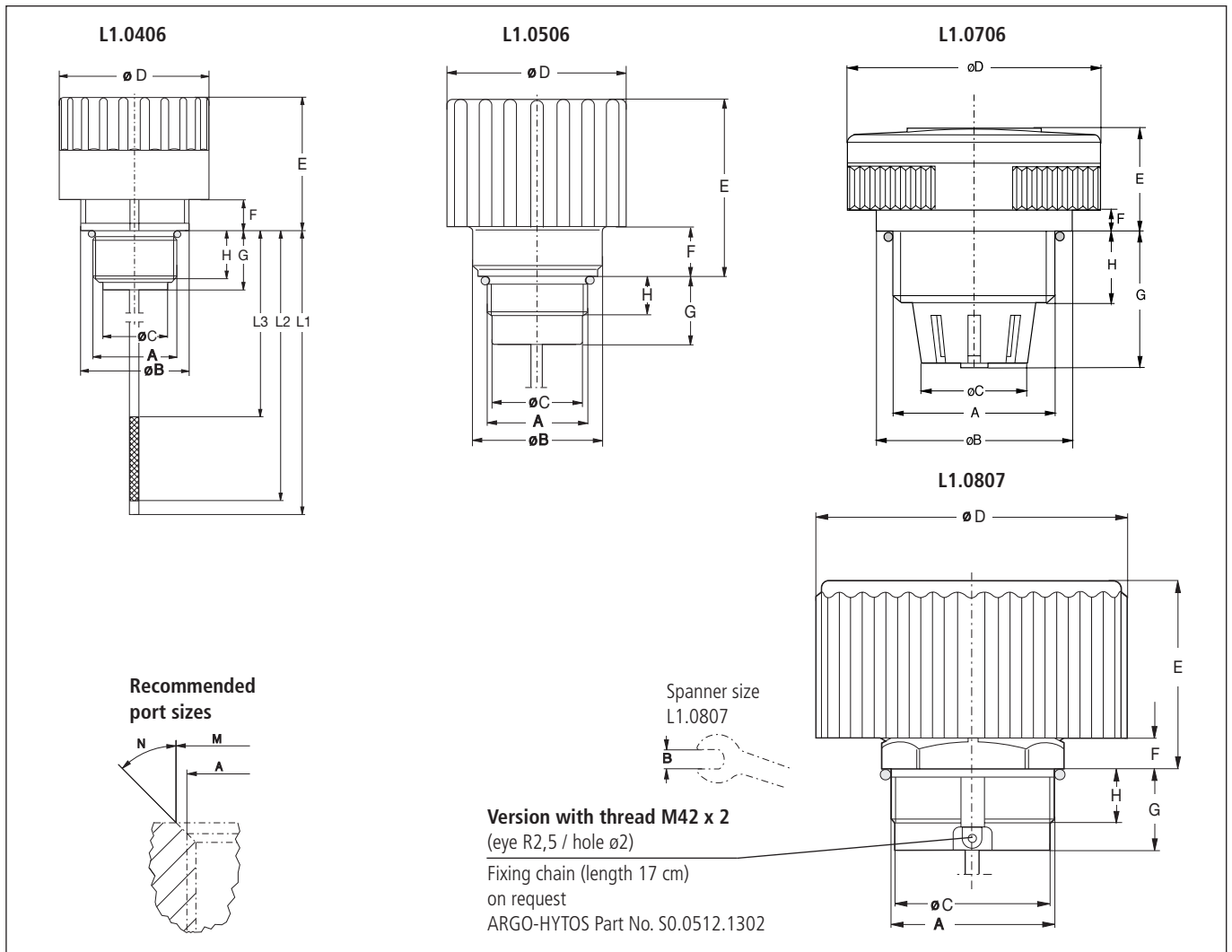
Part No.	Nominal flow rate	Pressure drop see diagram <b>D</b>	Filter curve no.	Filter fineness see Diagr. <b>Dx</b>	Connection A	Cracking pressure air IN	Cracking pressure air OUT	Dipstick measurement L1	Dipstick measurement L2	Dipstick measurement L3	Symbol	Weight	Remarks
	l/min			cm <sup>2</sup>		bar	bar	mm	mm	mm		g	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
L1.0406-12	120	<b>D1/4</b>	2 CL	46	M18 x 1,5	-	-	-	-	-	1	25	-
L1.0406-21	25	<b>D1/1</b>	2 CL	46	M18 x 1,5	-	-	-	-	-	1	25	with labyrinth oil separator
L1.0406-73	25	<b>D1/1</b>	2 CL	46	M18 x 1,5	-	-	75	70	55	1	30	with labyrinth oil separator
L1.0406-76	25	<b>D1/1</b>	2 CL	46	M18 x 1,5	-	-	80	75	60	1	30	with labyrinth oil separator
L1.0406-45	25	<b>D1/1</b>	2 CL	46	M18 x 1,5	-	-	95	90	45	1	35	with labyrinth oil separator
L1.0406-69	25	<b>D1/1</b>	2 CL	46	M18 x 1,5	-	-	100	95	80	1	35	with labyrinth oil separator
L1.0406-56	25	<b>D1/1</b>	2 CL	46	M18 x 1,5	-	-	130	125	100	1	35	with labyrinth oil separator
L1.0406-03	135	<b>D1/5</b>	2 CL	46	M22 x 1,5	-	-	-	-	-	1	25	-
L1.0406-87	30	<b>D1/2</b>	2 CL	46	M22 x 1,5	-	-	-	-	-	1	25	with labyrinth oil separator
L1.0406-60	30	<b>D1/2</b>	2 CL	46	M22 x 1,5	-	-	85	80	55	1	30	with labyrinth oil separator
L1.0406-79	135	<b>D1/2</b>	2 CL	46	M22 x 1,5	-	-	120	115	90	1	35	-
L1.0406-51	30	<b>D1/2</b>	2 CL	46	M22 x 1,5	-	-	130	125	-	1	35	with labyrinth oil separator
L1.0406-59	30	<b>D1/2</b>	2 CL	46	M22 x 1,5	-	-	130	125	100	1	35	with labyrinth oil separator
L1.0406-98	30	<b>D1/2</b>	2 CL	46	M22 x 1,5	-	-	180	175	150	1	40	with labyrinth oil separator
L1.0406-33	30	<b>D1/2</b>	2 CL	46	M22 x 1,5	-	-	250	235	215	1	40	with labyrinth oil separator
L1.0406-101	16	<b>D1/3</b>	2 CL	5,5	M22 x 1,5	-	-	-	-	-	1	25	-
L1.0506-73	150 *	<b>D2/3</b>	2 CL	48	M22 x 1,5	-0,03	0,20	-	-	-	2	55	-
L1.0506-91	150 *	<b>D2/2</b>	2 CL	48	M22 x 1,5	-0,03	0,35	-	-	-	2	55	-
L1.0506-43	150 *	<b>D2/1</b>	2 CL	48	M22 x 1,5	-0,03	1,60	-	-	-	2	55	-
L1.0706-03	250	<b>D1/6</b>	2 CL	46	M30 x 1,5	-	-	-	-	-	1	50	-
L1.0706-02	250	<b>D1/6</b>	2 CL	46	M42 x 2,0	-	-	-	-	-	1	50	-
L1.0807-11	800	<b>D1/8</b>	2 CL	320	M30 x 1,5	-	-	-	-	-	1	140	with flat gasket
L1.0807-61	550 *	<b>D3/3</b>	2 CL	320	M30 x 1,5	-0,03	0,35	-	-	-	2	160	-
L1.0807-21	650	<b>D1/7</b>	2 CL	320	G¾	-	-	-	-	-	1	140	-
L1.0807-81	550 *	<b>D3/4</b>	2 CL	320	G¾	-0,03	0,20	-	-	-	2	160	with flat gasket
L1.0807-71	550 *	<b>D3/3</b>	2 CL	320	G¾	-0,03	0,35	-	-	-	2	160	-
L1.0807-93	550 *	<b>D3/2</b>	2 CL	320	G¾	-0,03	0,50	-	-	-	2	160	-
L1.0807-63	550 *	<b>D3/1</b>	2 CL	320	G¾	-0,03	1,00	-	-	-	2	160	-
L1.0807-31	850	<b>D1/9</b>	2 CL	320	M42 x 2,0	-	-	-	-	-	1	140	-
L1.0807-91	550 *	<b>D3/4</b>	2 CL	320	M42 x 2,0	-0,03	0,20	-	-	-	2	160	-
L1.0807-51	550 *	<b>D3/3</b>	2 CL	320	M42 x 2,0	-0,03	0,35	-	-	-	2	160	-
L1.0807-14	850	<b>D1/9</b>	2 CL	320	M60 x 2,0	-	-	-	-	-	1	140	-

### Remarks:

- The ventilating filters listed in this chart are standard filters. If modifications are required, e.g., with integrated dipstick, we kindly ask for your request.
- Ventilating filters in Vandalism Proof design see catalogue sheet 50.20.

\* Δp < 0,1 bar for air IN

## Dimensions



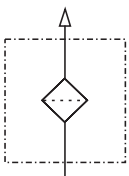
## Measurements

Type	A*	B	C	D	E	F	G	H	M	N
<b>L1.0406</b>	M18 x 1,5, M22 x 1,5	31,5	16	37	33,5	7,5	16,5	13,5	as A	45°
<b>L1.0506</b>	M22 x 1,5	29	19,5	46	46	13	17,5	10,5	as A	45°
<b>L1.0706</b>	M30 x 1,5	51	20,5	66	26,5	6	35	18	as A	45°
	M42 x 2	51	28	66	26,5	6	35	18	as A	45°
<b>L1.0807</b>	M30 x 1,5	SW 47	27	80	50	7,5	17,5	13,5	as A	45°
	M42 x 2	SW 47	40	80	50	8	21	14	48	45°
	M60 x 2	SW 47	56,4	80	52	11	18	15	as A	45°
	G¾	SW 33	24	80	50	7,5	17,5	13,5	as A	45°

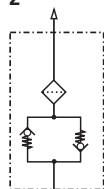
\* The thread dimensions do not exactly conform to the DIN ISO standard thread (functioning with the DIN ISO standard thread is guaranteed)

## Symbols

1



2



## Layout

### Sizes

The determining factor for selecting the size is the maximum over / under pressure allowed in the container.

For versions without double check valves, the initial pressure drop with a clean air filter should not exceed 0,03 bar.

For versions with double check valves, the initial pressure drop for air IN with a clean air filter should not exceed 0,1 bar.

### Filter fineness

In the ideal case, the fineness of the ventilating filter matches the fineness of the system filter (see also CETOP RP 98 H).

By the use of filter fineness 2 CL the ingress of dust into the tank is effectively reduced.

### Mounting

The ventilating filter should be mounted in a low-dust area of the machine and not in depressions in which water can collect.

For mobile use, the ventilating filter is to be mounted on the tank such that neither splashing oil from the inside nor spray water from the outside can reach the area of the ventilation opening.

### Double check valves

By the use of double check valves, the exchange of air between the tank and the environment can be considerably reduced, whereby the ingress of dust is minimized and the lifetime of the air filter element is increased.

With the double check valve, a predefined level of pressure can be created in the tank in order to improve the suction conditions for the pumps.

The valve opening pressure required for the ventilating filter can be approximately determined with the ideal gas equation depending on the following system characteristics:

- differential volume,
- volume of oil in the system,
- volume of air in the tank and the
- operating temperatures.

## 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

ARGO-HYTOS GMBH · Industriestraße 9 · D-76703 Kraichtal

Tel: +49 7250 76-0 · Fax: +49 7250 76-199 · [info.de@argo-hytos.com](mailto:info.de@argo-hytos.com) · [www.argo-hytos.com](http://www.argo-hytos.com)



**Ventilating Filters – Vandalism Proof**



**L1.0808 • L1.0809**

- Connection up to M42 x 2
- Nominal flow rate up to 850 l/min

## Description

### Application

Ventilation of tanks for hydraulic and lubrication systems, and gearboxes.

### General

The oil levels in the tanks of hydraulic systems are subject to continuous variation due to temperature changes and the operation of cylinders and pressure vessels.

In order to prevent over pressure in the tanks, an exchange of air with the external atmosphere is necessary. By the use of a ventilating filter, the outside air that is drawn in is filtered and the ingress of dust is therefore prevented.

### Special features

The ventilation openings are designed that dust on the surface of the tank is not drawn in, and that the ingress of spray and rainwater is largely prevented.

The use in marine applications presents no problem due to the use of synthetic materials and stainless steel.

The patented vandalism proof ventilating filters can only be removed with the special tool supplied. This makes the removal of the ventilating filter or the ingress of dirt via the filling / ventilation opening considerably more difficult.

### Design

Flow direction bi-directional (air IN/OUT). The star-shaped pleating of the filter material results in:

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

### Ordering options / versions

Integrated oil-level dipstick:

A dipstick can be integrated in the ventilating filter for checking the oil level. Therefore, a separate dipstick or an additional opening in the tank is not required.

Double check valves:

By the use of double check valves, the exchange of air between the tank and the environment can be considerably reduced, whereby the ingress of dust is minimized and the lifetime of the air filter element can be increased. With the double check valve, an over-pressure can be created in the tank in order to improve the suction conditions for the pumps.

A further advantage is the reduction of spray water ingress and the loss of oil through the ventilating filter.

Vandalism proof version "Standard" (L1.0808):

Ventilating filters in the patented vandalism proof version Can only be removed with the special spanner supplied (A/F 47). This makes the removal of the ventilating filter or the ingress of dirt via the filling / ventilation opening considerably more difficult.

Vandalism proof version "Easy Lock" (L1.0809):

Ventilators in the patented "Easy Lock" version can only be removed with the special pin supplied.

Standard ventilating filters without vandalism proof see catalogue sheet 50.10. Filling and ventilating filters with and without vandalism proof see catalogue sheet 50.30

### Maintenance

Ventilating filters should be changed at least every 1000 operating hours, or at minimum once a year.

## Characteristics

### Nominal flow rate

Up to 850 l/min (see Selection Chart, column 2)

The nominal flow rates indicated by ARGON-HYTOS are based on the following criteria:

- Ventilating filters without double check valve:  
 $\Delta p < 0,03 \text{ bar}$
- Ventilating filters with double check valve:  
 $\Delta p < 0,1 \text{ bar}$  for air IN

### Connection

Threaded ports according to ISO 228 or DIN 13.

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

### Filter fineness

2  $\mu\text{m}$

Tested in a single pass test with ISO MTD

### Hydraulic fluids

Mineral oil and biodegradable fluids

(HEES u. HETG, see info sheet 00.20)

### Temperature range hydraulic fluid

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

### Temperature range environment

- 30 °C ... + 100 °C

### Materials

Cap:	Polyamide, GF reinforced
Base:	Polyamide, GF reinforced
Dipstick:	Stainless steel (1.4301)
Spanner:	Steel, galvanized
Gaskets:	NBR (Viton on request)
Filter media:	Composite, multi-layer

### Mounting position

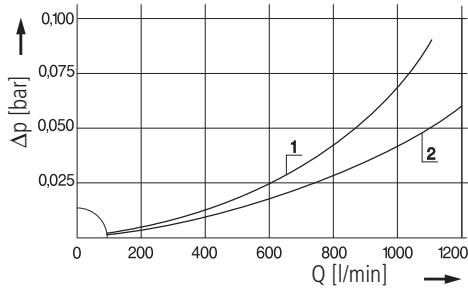
No limitation, position on the tank see section Layout



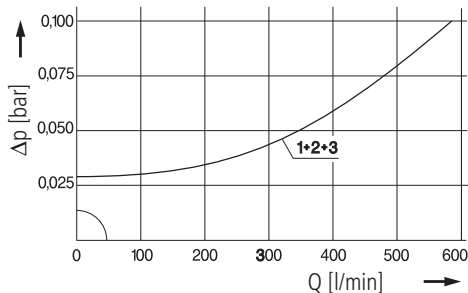
## Diagrams

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

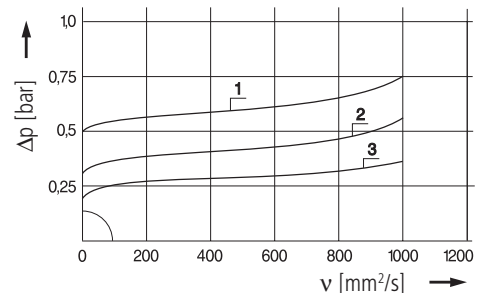
#### D1 Pressure drop as a function of the **flow volume** air IN/OUT



#### D2 Pressure drop as a function of the **flow volume** air IN

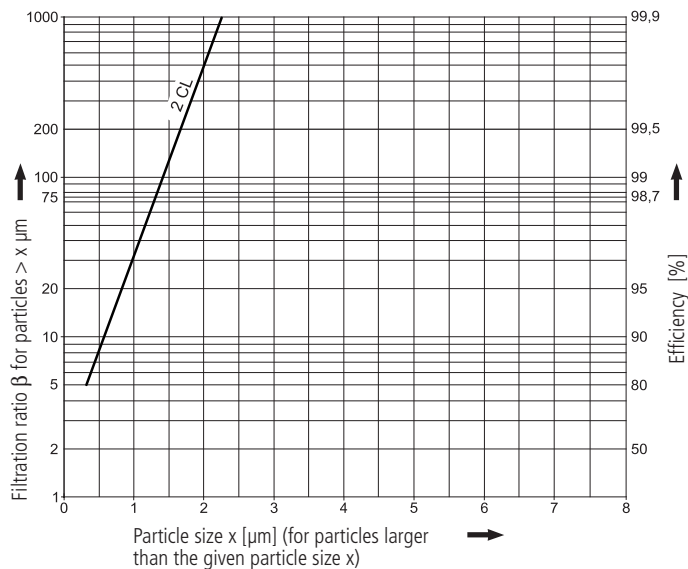


#### Pressure drop as a function of the **flow volume** air OUT



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

#### Dx Filtration ratio $\beta$ as a function of particle size $x$ tested in a single pass test with ISO MTD



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

**2 CL** = 2  $\mu\text{m}$  Composite  
99,5 % efficiency for particles of size 2  $\mu\text{m}$   
tested in a single pass test with ISO MTD

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

## Selection Chart

[illegible]

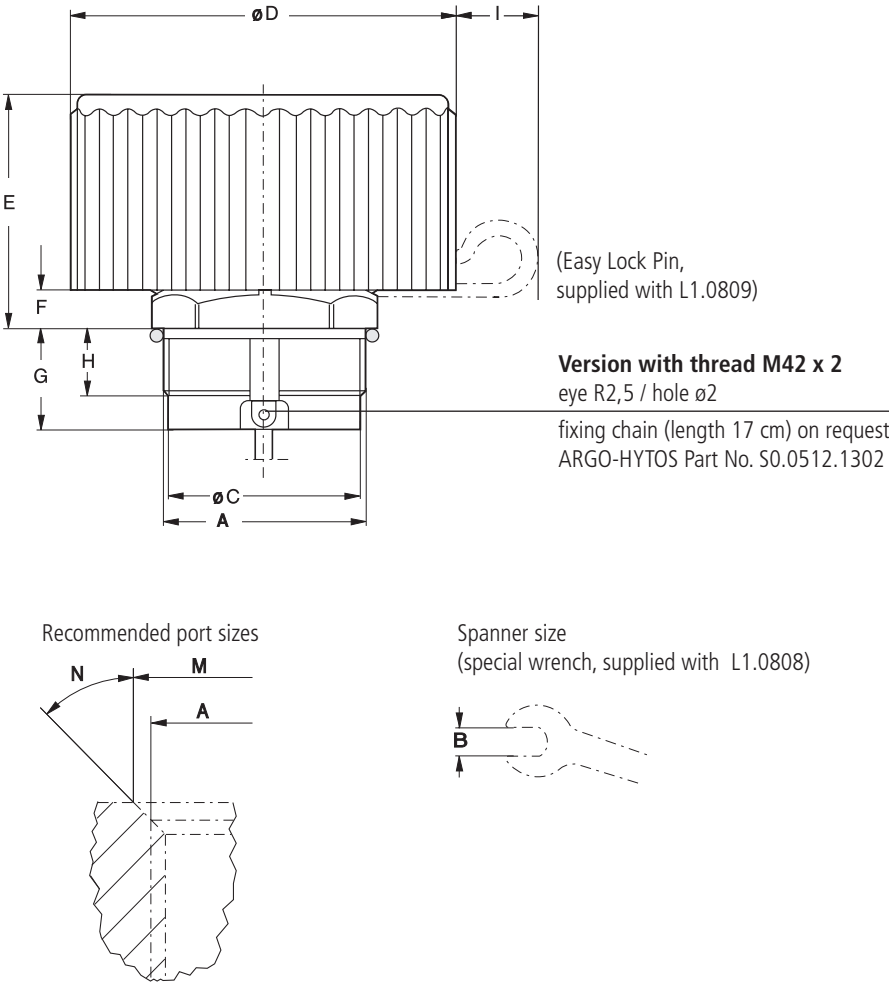
## Remarks:

- The ventilating filters listed in this chart are standard filters. If modifications are required, e.g., with integrated dipstick, we kindly ask for your request.

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\* $\Delta p < 0,1$  bar for air IN

# Dimensions

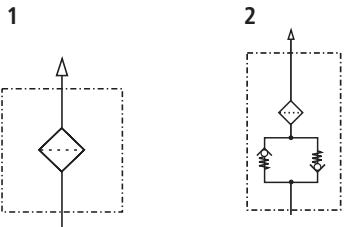


# Measurements

Type	A*	B	C	D	E	F	G	H	I	M	N
L1.0808	M42 x 2	SW 47	40	80	50	8	21	14	-	48	45°
L1.0809	G $\frac{3}{4}$	SW 33	24	80	50	7,5	17,5	13,5	16	as A	45°
	M42 x 2	SW 47	40	80	50	8	21	14	16	48	45°

\* The thread dimensions do not exactly conform to the DIN ISO standard thread (functioning with the DIN ISO standard thread is guaranteed)

# Symbols



## Layout

### Sizes

The determining factor for selecting the size is the maximum over / under pressure allowed in the container.

For versions without double check valves, the initial pressure drop with a clean air filter should not exceed 0,03 bar.

For versions with double check valves, the initial pressure drop for air IN with a clean air filter should not exceed 0,1 bar.

### Filter fineness

In the ideal case, the fineness of the ventilating filter matches the fineness of the system filter (see also CETOP RP 98 H).

By the use of filter fineness 2 CL the ingress of dust into the tank is effectively reduced.

### Mounting

The ventilating filter should be mounted in a low-dust area of the machine and not in depressions in which water can collect.

For mobile use, the ventilating filter is to be mounted on the tank such that neither splashing oil from the inside nor spray water from the outside can reach the area of the ventilation opening.

### Double check valves

By the use of double check valves, the exchange of air between the tank and the environment can be considerably reduced, whereby the ingress of dust is minimized and the lifetime of the air filter element is increased.

With the double check valve, a predefined level of pressure can be created in the tank in order to improve the suction conditions for the pumps.

The valve opening pressure required for the ventilating filter can be approximately determined with the ideal gas equation depending on the following system characteristics:

- differential volume,
- volume of oil in the system,
- volume of air in the tank and the
- operating temperatures.

## 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.

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ARGO-HYTOS GMBH · Industriestraße 9 · D-76703 Kraichtal

Tel: +49 7250 76-0 · Fax: +49 7250 76-199 · [info.de@argo-hytos.com](mailto:info.de@argo-hytos.com) · [www.argo-hytos.com](http://www.argo-hytos.com)



**Ventilating Filters – Vandalism Proof**

**LE.0716 • LE.0817**  
**LE.0827 • LE.0818**  
**LE.0819**

- With filling filter
- 6 hole flange
- Nominal flow rate up to 850 l/min

## Description

### Application

Filling / ventilation of tanks for hydraulic and lubrication systems as well as gearboxes.

### General

The oil levels in the tanks of hydraulic systems are subject to continuous variation due to temperature changes and the operation of cylinders and pressure vessels.

In order to prevent over pressure in the tanks, an exchange of air with the external atmosphere is necessary. By the use of a ventilating filter, the outside air that is drawn in is filtered and the ingress of dust is therefor prevented.

A combined filling filter prevents coarse impurities from entering during filling or re-filling due to maintenance or repair reasons.

### Special features

The profiled metal flange with elastomer sealing and the mounting with 6 screws ensure that the filling / ventilating filters seal reliable even on non-planar tank surfaces. Filler screens made of sturdy expanded metal offer 100% safety during filling of the tank – which excludes any damage being caused for example by the filler neck. The ventilating filter is fixed by a chain at the filling filter to prevent it from being lost (exception: LE.0716). The ventilation openings of the ventilating filters are designed that dust on the surface of the tank is not drawn in, and that the ingress of spray and rainwater is largely prevented.

The patented vandalism proof ventilating filters can only be removed with the special tool supplied. This makes the misuse of the ventilating filter or the ingress of dirt via the filling / ventilation opening considerably more difficult.

### Design

Filling filter: cylinder screen - flow direction from centre to outside.

Ventilating filter: Flow direction bi-directional (air IN / OUT). The star-shaped pleating of the filter material results in:

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

### Ordering options / versions

Integrated oil-level dipstick

A dipstick can be integrated in the ventilating filter for checking the oil level. Therefor, a separate dipstick or an additional opening in the tank is not required.

Double check valve in the ventilating filter:

By the use of double check valves, the exchange of air between the tank and the environment is considerably reduced, whereby the ingress of dust is minimized and the lifetime of the air filter element is increased. With the double check valve, an over-pressure is created in the tank in order to improve the suction conditions for the pumps. A further advantage is the reduction of spray water ingress and the loss of oil through the ventilating filter.

Vandalism proof version "Standard" (LE.0818):

Ventilating filters in the patented vandalism proof version can only be removed with the special spanner supplied (A/F 47).

Vandalism proof version "Easy Lock" (L1.0819):

Ventilating filters in the patented "Easy Lock" version can only be removed with the special pin supplied.

This makes the misuse of the ventilating filter or the ingress of dirt via the filling / ventilation opening considerably more difficult.

### Maintenance

Ventilating filters should be changed at least every 1000 operating hours, or at minimum once a year.

## Characteristics

### Nominal flow rate

Filling filter: up to 140 l/min.

Ventilating filter: up to 850 l/min (see Selection Chart, column 2)  
The nominal flow rates indicated by ARGO-HYTOS are based on the following criteria:

- Ventilating filters without double check valve:  
 $\Delta p < 0,03$  bar for air IN
- Ventilating filters with double check valve:  
 $\Delta p < 0,1$  bar for air IN

### Connection

Filling filter: 6 hole flange, hole pattern according to DIN 24557/T2

Ventilating filter: outer thread M42 x 2 (the thread dimensions do not exactly conform to the ISO standard thread / functioning with the ISO standard thread is guaranteed)

### Mounting / sealing

Version without double check valve:

6 self-tapping screws ISO 1479-ST4,8x16-C with washers

Version with double check valve:

6 philips head screws ISO 7045 M5x16-4.8-Z with O-rings

Sealing of flange with elastomer gasket

(screws and gaskets included in basic equipment)

### Filter fineness

Filling filter: 800  $\mu$ m

Ventilating filter: 2  $\mu$ m, tested in a single pass test with ISO MTD

### Hydraulic fluids

Mineral oil and biodegradable fluids  
(HEES u. HETG, see info sheet 00.20)

### Temperature range hydraulic fluid

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

### Temperature range environment

- 30 °C ... + 100 °C

### Materials

Cap: Polyamide, GF reinforced

Base: Polyamide, GF reinforced

Filler screen: Steel, galvanized

Spanner: Steel, galvanized

Gaskets: NBR (Viton on request)

Filter media: Composite, multi-layer

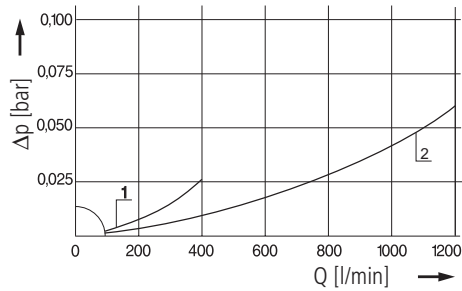
### Mounting position

No limitation , position on the tank see section Layout

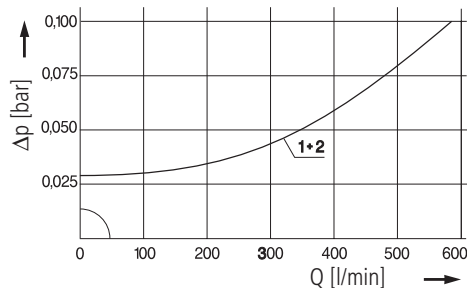
## Diagrams

### $\Delta p$ -curves for complete filters in Selection Chart, column 2

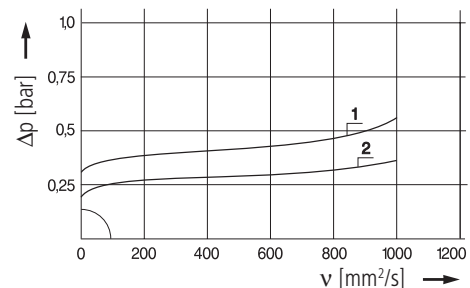
#### D1 Pressure drop as a function of the flow volume Air IN/OUT



#### D2 Pressure drop as a function of the flow volume Air IN

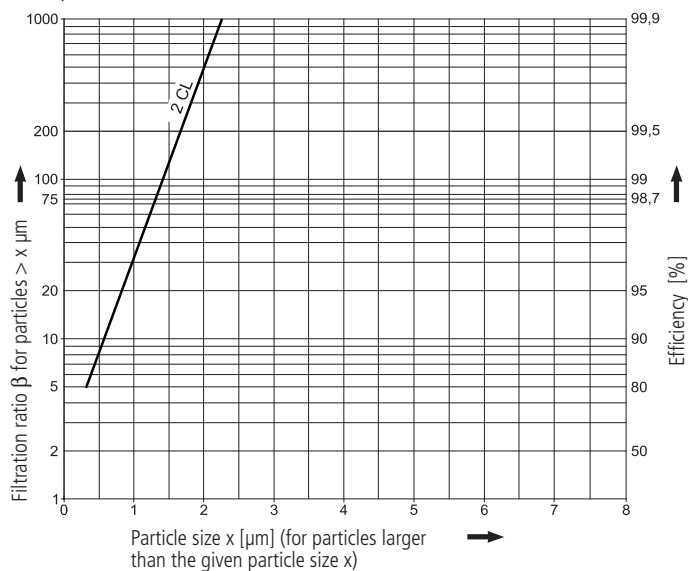


#### Pressure drop as a function of the flow volume Air OUT



### Filter fineness curves in Selection Chart, column 5

#### Dx Filtration ratio $\beta$ as a function of particle size $x$ tested in a single pass test with ISO MTD



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

**2 CL** = 2  $\mu\text{m}$  Composite  
99,5 % efficiency for particles of size 2  $\mu\text{m}$   
tested in a single pass test with ISO MTD

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



## Selection Chart

[illegible]

**Remark:**  
The ventilating filters listed in this chart are standard filters. If modifications are required we kindly ask for your inquiry.

**Remark:**  
The ventilating filters listed in this chart are standard filters. If modifications are required we kindly ask for your inquiry.

<sup>1</sup> at 200 mm<sup>2</sup>/s (ISO VG 46 at approx. 15 °C)      <sup>2</sup> Δp < 0,1 bar for air IN

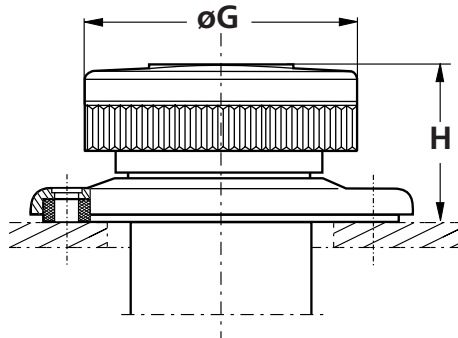
<sup>3</sup> Ventilating filter not fixed by a chain at the filling filter

<sup>1</sup> at 200 mm<sup>2</sup>/s (ISO VG 46 at approx. 15 °C)      <sup>2</sup> Δp < 0,1 bar for air IN

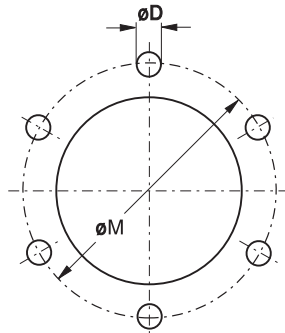
<sup>3</sup> Ventilating filter not fixed by a chain at the filling filter

## Dimensions

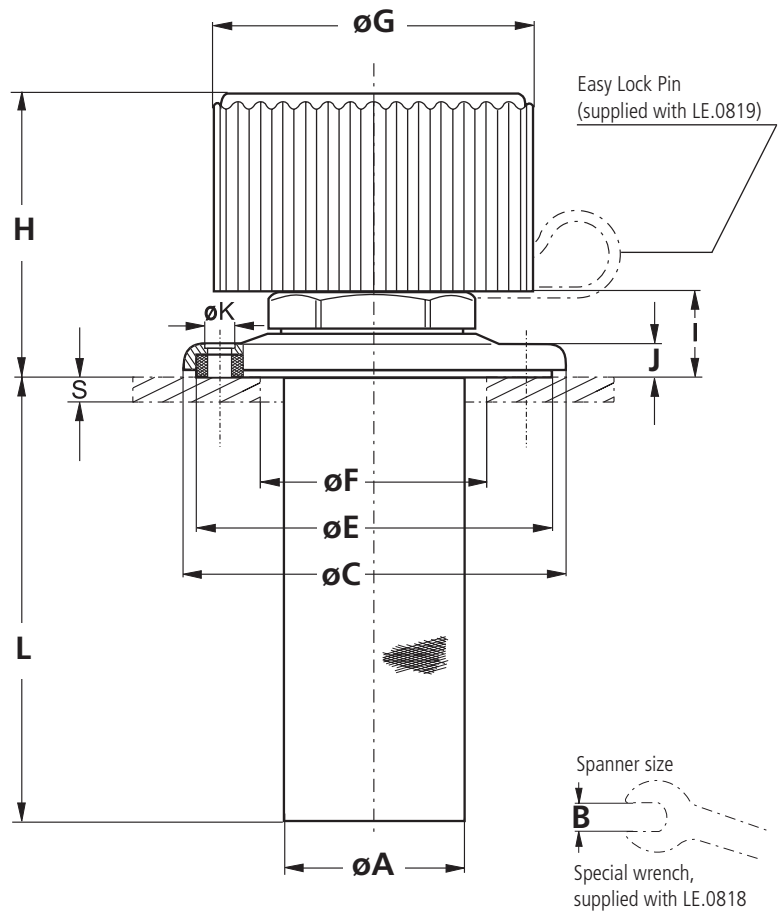
LE.0716



Hole pattern for tank  
(core hole Ø D for steel material as per table)



LE.0817 · LE.0827 · LE.0818 · LE.0819



## Measurements

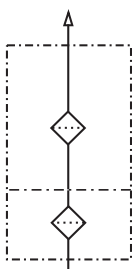
Type	A	B	C	E	F	G	H	I	J	K	L	M
LE.0716	46	-	89,5	84,5	58	66	36	15	6	5,6 ± 0,3	111	73
LE.0817	46	47	89,5	84,5	58	80	61	20	6	5,6 ± 0,3	111	73
LE.0827	46	47	89,5	84,5	58	80	61	20	6	5,6 ± 0,3	200	73
LE.0818	46	47	89,5	84,5	58	80	61	20	6	5,6 ± 0,3	111	73
LE.0819	46	47	89,5	84,5	58	80	61	20	6	5,6 ± 0,3	111	73

Plate thickness S over/up to	hole D*
1,00 / 1,75	3,9
1,75 / 3,00	4,1
3,00 / 4,75	4,4
4,75	M5

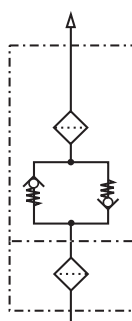
\* Core hole Ø D for self-tapping screws according to DIN 7975 for versions without double check valve. For versions with double check valve always use M5.  
Fastening screws included in basic equipment.

## Symbols

1



2



## Layout

### Sizes

The determining factor for selecting the size is the maximum over / under pressure allowed in the tank.

For versions without double check valves, the initial pressure drop with a clean air filter should not exceed 0,03 bar.

For versions with double check valves, the initial pressure drop for air IN with a clean air filter should not exceed 0,1 bar.

### Filter fineness

In the ideal case, the fineness of the ventilating filter matches the fineness of the system filter (see also CETOP RP 98 H).

By the use of filter fineness 2 CL the ingress of dust into the tank is effectively reduced.

### Mounting

The ventilating filter should be mounted in a low-dust area of the machine and not in depressions in which water can collect.

For mobile use, the ventilating filter is to be mounted on the tank such that neither splashing oil from the inside nor spray water from the outside can reach the area of the ventilation opening.

### Double check valves

By the use of double check valves, the exchange of air between the tank and the environment can be considerably reduced, whereby the ingress of dust is minimized and the lifetime of the air filter element is increased.

With the double check valve, a predefined level of pressure can be created in the tank in order to improve the suction conditions for the pumps.

The valve opening pressure required for the ventilating filter can be approximately determined with the ideal gas equation depending on the following system characteristics:

- differential volume,
- volume of oil in the system,
- volume of air in the tank and the
- operating temperatures.

## 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

ARGO-HYTOS GMBH · Industriestraße 9 · D-76703 Kraichtal

Tel: +49 7250 76-0 · Fax: +49 7250 76-199 · [info.de@argo-hytos.com](mailto:info.de@argo-hytos.com) · [www.argo-hytos.com](http://www.argo-hytos.com)