RMF SYSTEMS

PURE POWER

RMF SYSTEMS®

WWW.RMFFILTER.COM

AIR CONDITIONER DESICCANT BREATHER

Benefits RMF 'Air conditioner'

- Reducing water contamination level prolongs the life of the additive package and reduces oxidation of the oil and bearing surfaces.
- Eliminates rusting due to condensation.
- Reduces machine downtime.
- Extends the machine's useful life.
- Reduces cost of ownership.

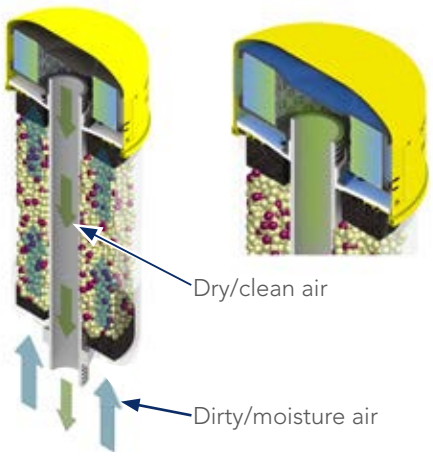
Air conditioners

CONDENSATION IN RESERVOIRS

HYDRAULIC AND LUBRICATING OILS MUST BE KEPT FREE FROM CONTAMINATION AND WATER. MOST FLUID RESERVOIRS MUST BE ABLE TO BREATHE, THUS ALLOWING WATER VAPOUR AND SOLID CONTAMINANTS TO ENTER. TEMPERATURE FLUCTUATIONS IN THE RESERVOIR WILL CAUSE THIS WATER VAPOUR TO CONDENSE WHICH WILL NOT ONLY CAUSE OXIDATION OF THE OIL, BUT CAN ALSO LEAD TO CONSIDERABLE MECHANICAL DAMAGE.

FILTRATION AND DRYING A SINGLE PROCESS

Standard air breathers remove some of the solid particles but allow water vapour in the air to pass freely. The RMF 'Air conditioner' deals effectively with both so reservoirs can breath clean, dry air. The air is first dried by passage through a column packed with ZR gel granules. The dried air is then passed through a pleated synthetic fibre filter element (replaceable spin-on type) where solid particles are removed, so that the air reaching the reservoir is both clean and dry.



MONITORING

The uptake of moisture can be observed by the change in colour of the indicator granules in the ZR gel. They turn from ruby-red (active) to light orange (replace). The ZR gel granules are completely replaceable, non toxic and non carcinogenic. An optional contamination indicator shows when the air filter is in need of replacement.

ACTIVE COAL

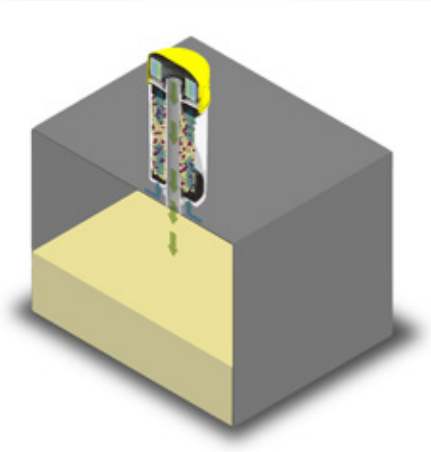
RMF 'Air conditioners' can be fitted with a combination of ZR gel and active coal, the active coal will eliminate oil vapour and the smell, it will also prevent the ZR gel from being contaminated with this oil damp.

ATMOSPHERICALLY CLOSED

The RMF range also offers some 'Air conditioners' for gearbox applications which have spring loaded (0.01 bar) check valves fitted in the base in opposing directions, opening only whilst inhaling or exhaling. This way there is no atmospheric contact with the air and the ZR gel under static conditions increasing the lifetime of the drying agent.

APPLICATIONS

RMF 'Air conditioners' can be used on hydraulic power units, lube and oil tanks, gearboxes, diesel fuel tanks and storage tanks for biodegradable fluids. Industries that are successfully applying 'Air conditioners' include: steel industry, aviation industry, forestry industry, pulp & paper industry, cement industry, petrochemical industry and mining industry.



Air Conditioners Accessoires

BENEFITS RMF OIL-DEMISTERS

- *Reduces premature filter exchange*
- *Reduces fluid spills on machine surfaces*
- *Reduces environmental risks*
- *Reduces fluid waste*
- *Reduces safety issues with oil spills*
- *Reduces cost of ownership*

WHERE CAN IT BE USED

RMF Oil-Demisters can be used on:

- *Hydraulic power units*
- *Lube and oil tanks*
- *Gearboxes*
- *Pump vents*
- *Pulp Refiners*

OIL-DEMISTERS

THE RMF SYSTEMS OIL–DEMISTERS ARE SPECIALLY DESIGNED TO PREVENT OIL MIST OR FLUID MIGRATION THROUGH AIR VENTS. THE RMF DEMISTER CONSISTS OF AN ALUMINIUM BODY WITH EXTERNAL COOLING RIBS AND CAN BE FITTED BELOW THE AIR CONDITIONER OR AIR FILTER.

Inside this aluminium body a coalescing post is positioned. When migrating oil vapour rises up this post the vapour coalesces into oil droplets which run down the outer diameter of the post and are guided back to tank through holes at the base of the post. In case of excessive splash the oil is contained in the post and runs down the slits in the post and is also returned to the reservoir.

OIL MIST

Air vents are used to compensate changes in air volume above the fluid level in gear boxes, hydraulic reservoirs, pump housings etc. High temperatures and thermal expansion cause migration of oil vapours through the air vent, blocking air filters and causing oil spills on machine surfaces. These fluid spills cause both an environmental and safety issue, they are also the cause of shortened air filter life and avoidable fluid consumption. In case of dynamic, volatile gearbox systems not only Oil Mist can migrate through air vents, but fluid splash can cause extreme fluid migration.

FILTER MINDER

To monitor the state of the air filter, RMF Systems offers a Filter Minder (vacuum switch).
The filter minder is a combination graduated indicator and switch (N/O), a yellow indicator moves up in the window and locks at the highest air filter restriction. When it reaches the red zone, or highest recommended restriction, it closes a contact and can send a signal to the filter warning light. The locked position at highest restriction must be reset manually. The filter minder can be fitted to a variety of the RMF Mounting or Adaptor Plates.

MOUNTING PLATES

RMF offers a range of Mounting or Adaptor Plates that can be fitted to hydraulic reservoirs, the mounting plates all have the standard DIN-24557/2 pattern. Mounting plates range from simple fitting of air conditioner only, mounting plate with additional port for vacuum indicator (Filter Minder), to mounting plates with additional porting, connection for suction and return off Off-line filters.
The mounting plates allow for simple and quick air conditioner and off line filter installation without the need for welding/ drilling etc. The sealing on the tank lid is achieved by an 'O' ring which is part of delivery. The mounting plates can be used with all RMF Systems Air Conditioners.

Air conditioners Specifications

LIGHT VERSION SERIES ACL..R / ACM..R			
TYPE	ACL93R (C)	ACL96R (C), (V)*	ACM61R
Total weight	0.9 kg	1.1 kg	0.4 kg
ZR gel volume	300 cc	600 cc	100 cc
Water adsorption	86 gram	172 gram	29 gram
Max. air flow	700 l/min	700 l/min (300 l/min)	50 l/min
Adsorption material	ZR gel 3-6 mm		
ZR gel	Non toxic		
Operating temp.**	-40... +90 °C		
Housing material	SAN (Styrene Acrylonitrile)		
FLUID COMPATIBILITY			
Mineral Oils: H, HL, HLP, HVLP	Ok		
HEES Synthetical ester	Ok		
Other fluids	contact RMF Systems		

HEAVY DUTY SERIES KL..R						
TYPE	KL93R (C)	KL96R (C), (V)*	KL121R (C), (V)*	KL122R (C), (V)*	KL121R(V)S,	KL122R(V)S
Total weight	1.2 kg	1.5 kg	2.7 kg	4.0 kg	4.2 kg	5.5 kg
ZR gel volume	300 cc	600 cc	1.000 cc	2.000 cc	1.000 cc	2.000 cc
Water adsorption	86 gram	172 gram	288 gram	576 gram	288 gram	576 gram
Max. air flow	700 l/min	700 l/min (300 l/min)	1.500 l/min (400 l/min)	1.500 l/min (400 l/min)	1.500 l/min (400 l/min)	1.500 l/min (400 l/min)
Adsorption material	ZR gel 3-6 mm					
ZR gel	Non toxic					
Operating temp.**	-40... +90 °C					
Housing material	SAN (Styrene Acrylonitrile)					
Inner core	AISI 304				AISI 316	
FLUID COMPATIBILITY						
Mineral Oils: H, HL, HLP, HVLP	Ok					
HEES Synthetical ester	Ok					
Other fluids	contact RMF Systems					

** C - Active coal, V - Check Valves*

*** Note that the operation of the desiccant breather may vary at temperatures below 0* °C due to very low humidity %.

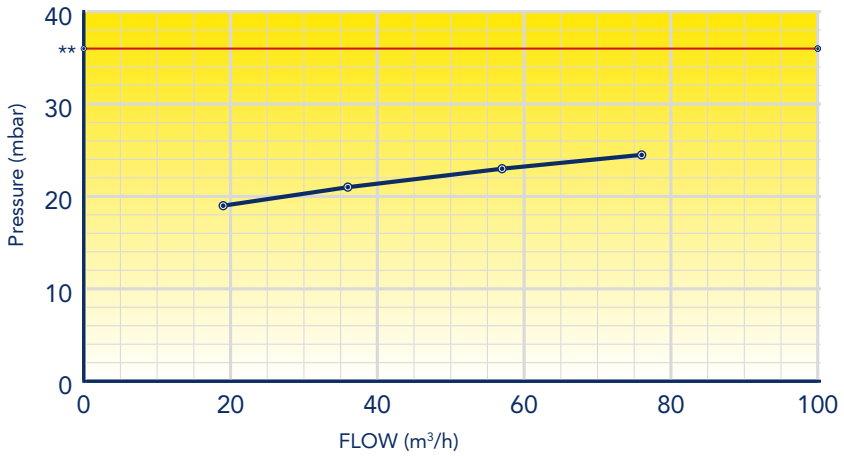
SPIN-ON SPECIFICATION

PRODUCT DETAILS	KL60	KL90	KL120	KL120S
Filter material	Glass fibre			Glass fibre
Housing material	Steel 0.50 DKP 7124			AISI 316
Surface Area	415 cm^2	754 cm^2	2116 cm^2	2000 cm^2
Filter efficiency	$\beta_3 = 200$			
Dirt Holding Capacity	3,2 gram MTD	6,0 gram MTD	16,5 gram MTD	

FLOW PRESSURE DIFFERENTIAL RMF SPIN-ONS

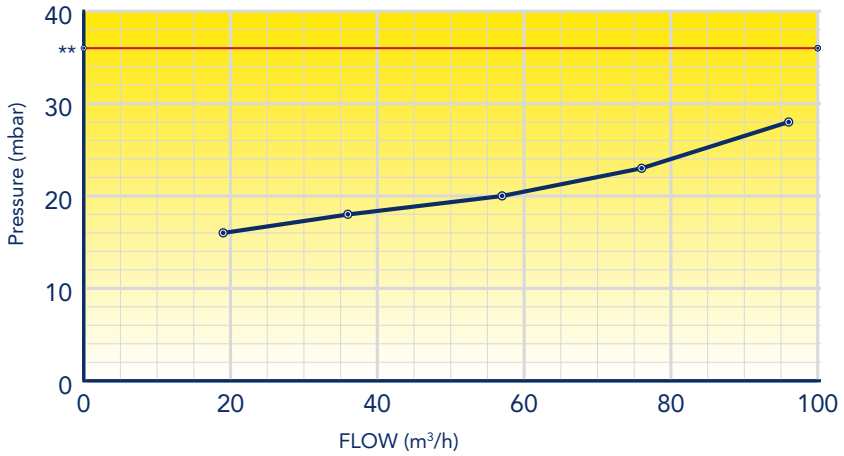
KL60 SPIN-ON	
FLOW (M³/H)	DIFFERENCES OF PRESSURE (MBAR)
19,0	19
36,0	21
57,0	23
76,0	24,5*

Max. Pressure Differential (Clean Filter)
**Pump damages could become possible above red line!



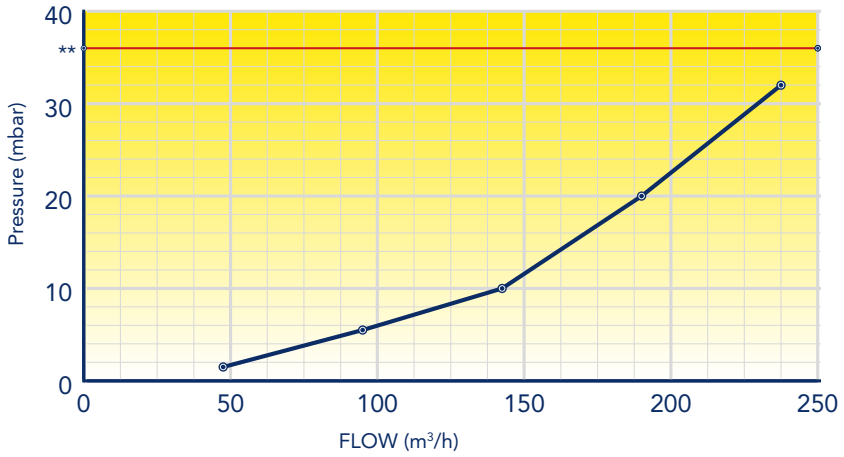
KL90 SPIN-ON	
FLOW (M³/H)	DIFFERENCES OF PRESSURE (MBAR)
19,0	16
36,0	18
57,0	20
76,0	23
96,0	28*

Max. Pressure Differential (Clean Filter)
**Pump damages could become possible above red line!



KL120 & KL120S SPIN-ON	
FLOW (M³/H)	DIFFERENCES OF PRESSURE (MBAR)
47,5	1,5
95,0	5,5
142,5	10
190,0	20
237,5	32*

Max. Pressure Differential (Clean Filter)
**Pump damages could become possible above red line!



DIMENSIONS AIR CONDITIONERS

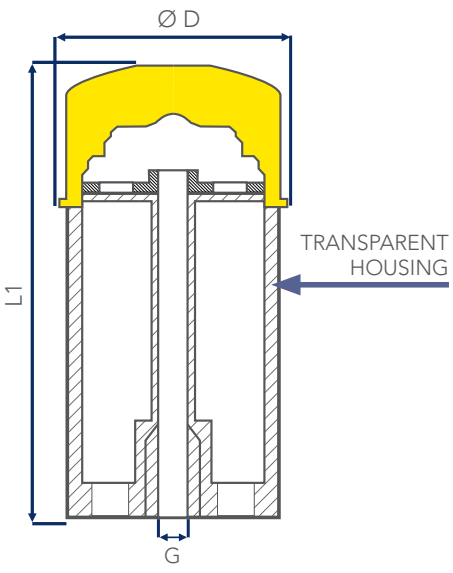
LIGHT VERSION SERIES ACL..R / ACM..R			
DIMENSIONS*	ACL93R (V)	ACL96R (C), (V)	ACM61R
L1	150 mm	210 mm	135 mm
Ø D	96 mm	96 mm	68 mm
G	¾" BSP female	¾" BSP female	⅜" BSP female

HEAVY DUTY SERIES KL..R						
DIMENSIONS	KL93R (C)	KL96R (C), (V)	KL121R (C), (V)	KL122R (C), (V)	KL121R(V)S,	KL122R(V)S
L1[1]	177 mm	238 mm	280 mm	391 mm	310 mm	421 mm
L2[2]	20 mm	20 mm	24 mm	24 mm	24 mm	24 mm
ØD[3]	96 mm	96 mm	130 mm	130 mm	128 mm	128 mm
G	¾" BSP male	¾" BSP male	1 ¼" BSP male	1 ¼" BSP male	1 ¼" BSP male	1 ¼" BSP male
AF	32 mm	32 mm	50 mm	50 mm	50 mm	50 mm

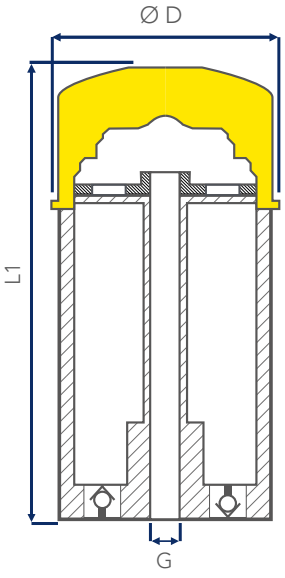
[1] Please note that dimension may vary. Tolerance ± 6 mm

[2] Please note that dimension may vary. Tolerance ± 2 mm

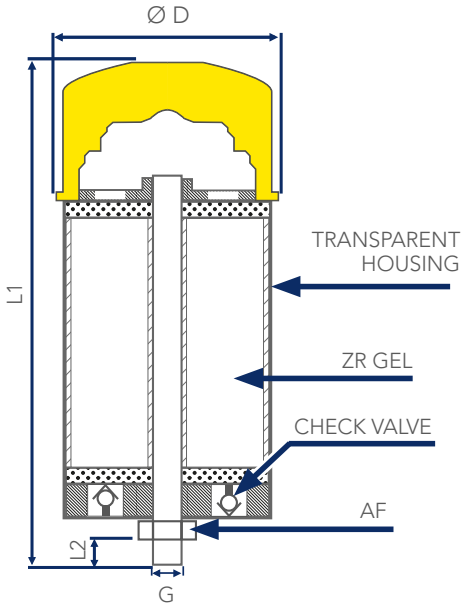
[3] Please note that dimension may vary. Tolerance ± 1 mm



ACL . . R

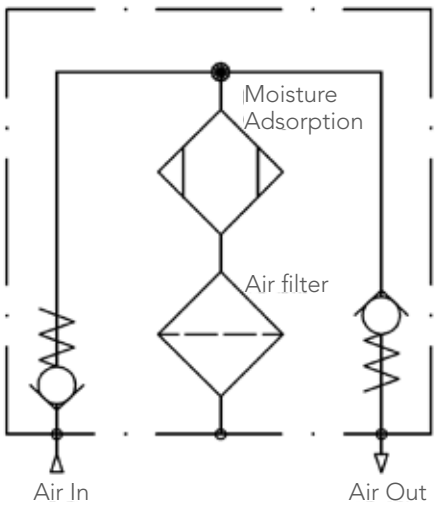


ACM . . RV

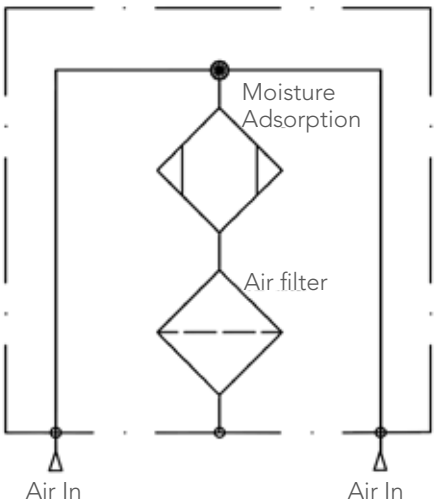


KL . . RV

HYDRAULIC SYMBOL



With check valves

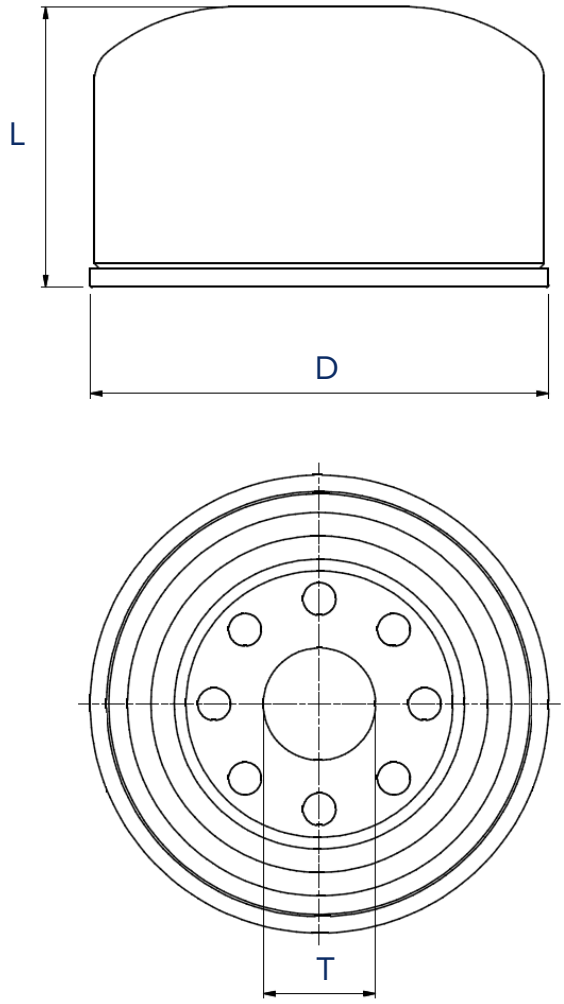


Without check valves

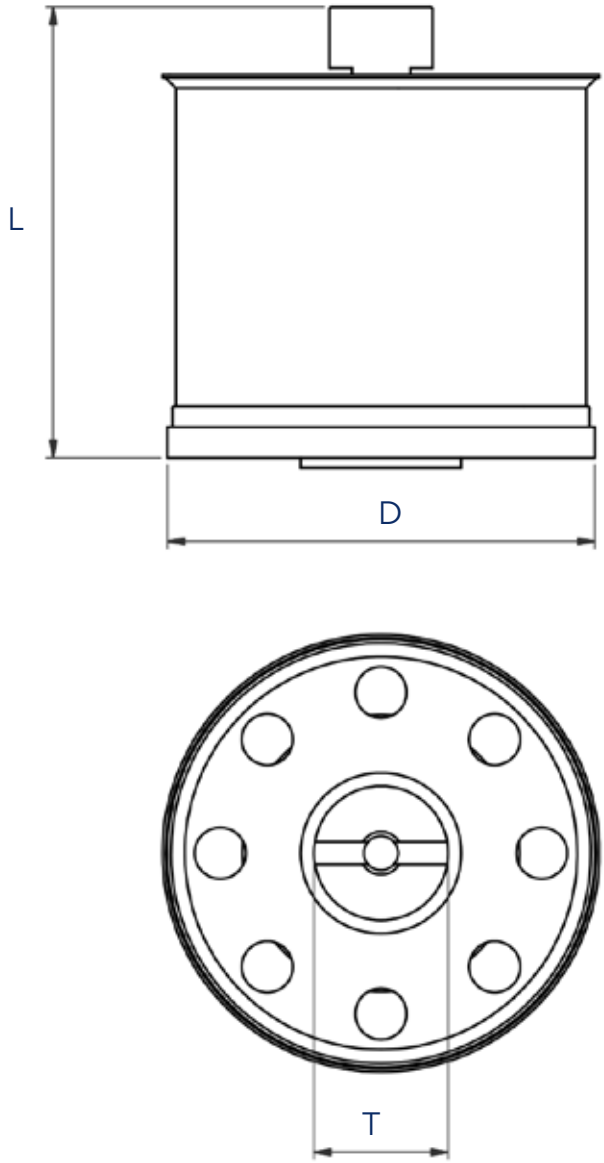
DIMENSIONS SPIN-ON AIR FILTERS

DIMENSIONS SPIN-ONS				
	KL60	KL90	KL120	KL120S
L	60 mm	60 mm	100 mm	132 mm
Ø D[1]	69 mm	98 mm	130 mm	128 mm
T	M20x1,5	R ¾ BSP"	R 1 ¼ BSP"	R 1 ¼"

[1] *Please note that dimension may vary. Tolerance ± 1 mm*



KL60, KL90, KL120



KL120S

Air conditioners Ordening codes

YOUR AIR CONDITIONER ORDERING CODE				
TABLE 1	TABLE 2	TABLE 3	TABLE 4	TABLE 5

TABLE 1 - TYPE OF BODY			CODE
TYPE OF BODY	TANK CONNECTION	AIR FILTER	
Heavy duty version	Male threading on stainless steel tube	3µ glass fibre spin-on	KL
Light version (only in 93 and 96 series)	Female threading in plastic housing	3µ glass fibre spin-on	ACL
Mini light version (only in 60 series)	Female ⅜" threading in plastic housing with two integrated check valves (0.01 bar)	3µ glass fibre spin-on	ACM

TABLE 2 - DIMENSIONS		CODE
MAX. AIR FLOW STANDARD VERSION ONLY SUITABLE FOR KL SERIES	RESTRICTED AIR FLOW WITH CHECK VALVES	
700 l/min	N.A.	93
700 l/min	300 l/min	96
1500 l/min	400 l/min	121
1500 l/min	400 l/min	122
ONLY SUITABLE FOR ACL SERIES		
700 l/min	N.A.	93
700 l/min	300 l/min	96
ONLY SUITABLE FOR ACM SERIES		
N.A.	50 l/min	61

TABLE 3 - SPECIFICATIONS				CODE
TYPE	DRYING AGENT	DESICCANT VOLUME	NOMINAL WATER ABSORBING CAPACITY	
61	ZR-gel	100 cc	29 grams	R
93	ZR-gel	300 cc	86 grams	R
96	ZR-gel	600 cc	172 grams	R
121	ZR-gel	1000 cc	288 grams	R
122	ZR-gel	2000 cc	576 grams	R
93	Approx. ⅔ ZR-gel, ⅓ active coal	200 cc / 100 cc	57 grams	RC
96	Approx. ⅔ ZR-gel, ⅓ active coal	400 cc / 200 cc	115 grams	RC
121	Approx. ⅔ ZR-gel, ⅓ active coal	700 cc / 300 cc	201 grams	RC
122	Approx. ⅔ ZR-gel, ⅓ active coal	1400 cc / 600 cc	403 grams	RC

TABLE 4 - OPTIONS	CODE
No check valves	-
Integrated check valves (0.01 bar), not available for 93 series. Note: restricted airflow	V

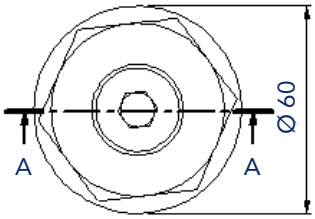
TABLE 5 - OPTIONS*	CODE
Standard spin-on	-
Stainlees steel spin-on	S

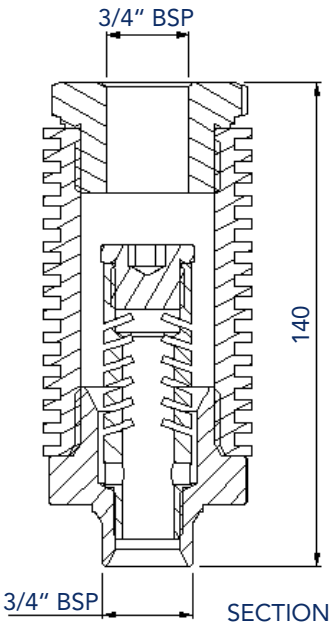
* Only available in combination with KL121 & KL122 series Air Conditioners.

Please note the following:
Installing an Air Conditioner with spring loaded check valves may cause an over- or under pressure of approximately 0.01 bar (10mbar) inside the reservoir.

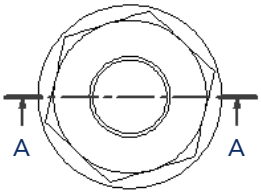
Oil-Demister Specifications

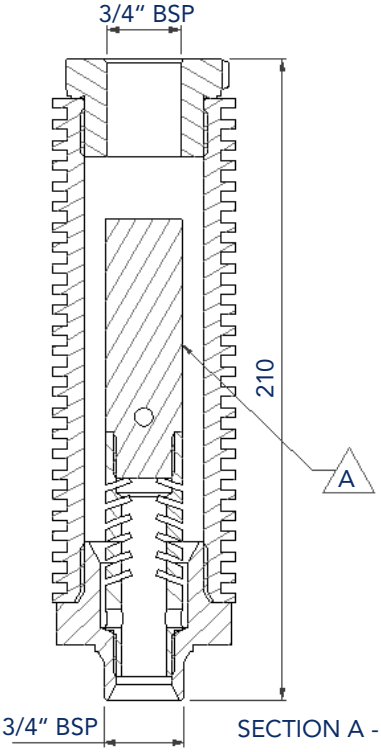
OIL-DEMISTER	140	210
DIMENSIONS		
	140x60 mm	210x60 mm
WEIGHT		
	1,03 kg	1,25 kg
CONNECTIONS		
	Base 3/4"BSP int.	Base 3/4"BSP int.
	Top 3/4"BSP or 1 1/4" BSP	Top 3/4"BSP or 1 1/4" BSP
MATERIAL		
Body	Anodized Aluminum	
Base adaptor	Steel	
Top adaptor	Steel	
Flow rate (air)	1000 l/min.	
OIL-DEMISTER CAPACITY		
	See diagram	



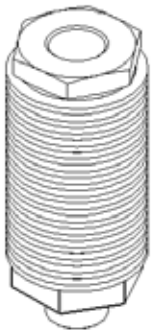


SECTION A - A





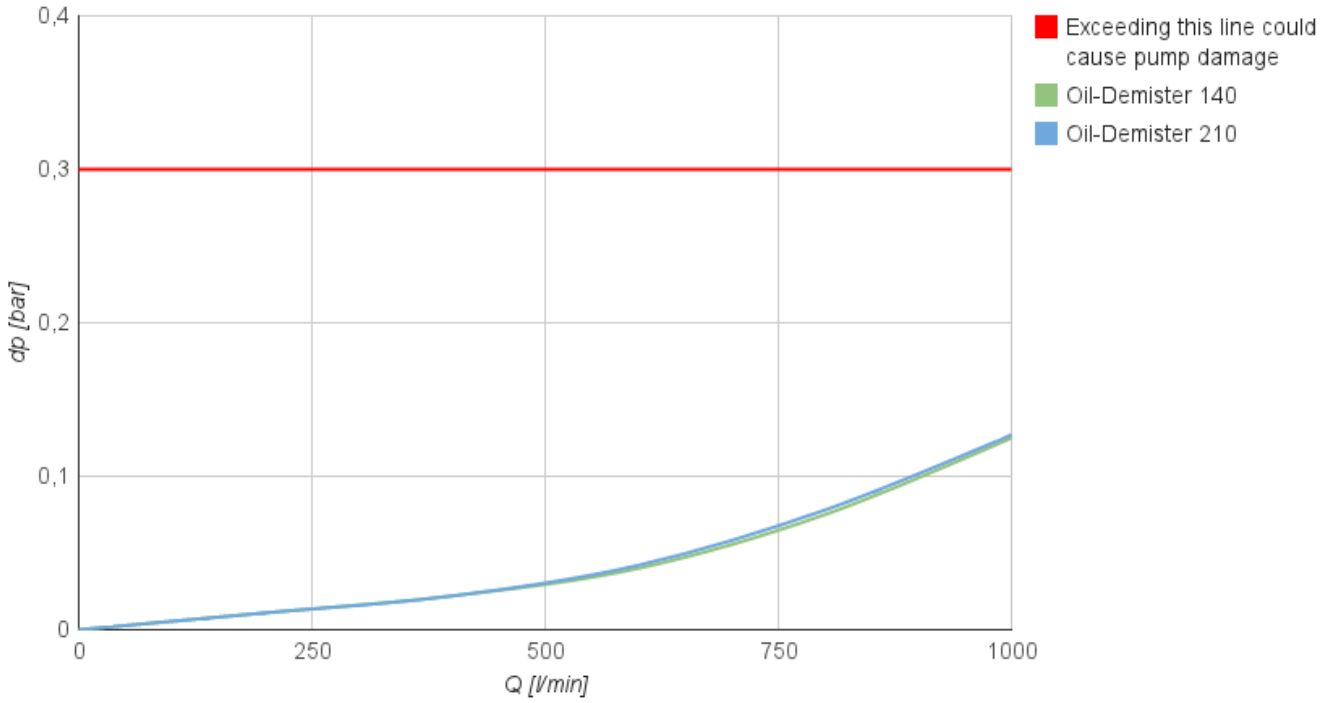
SECTION A - A



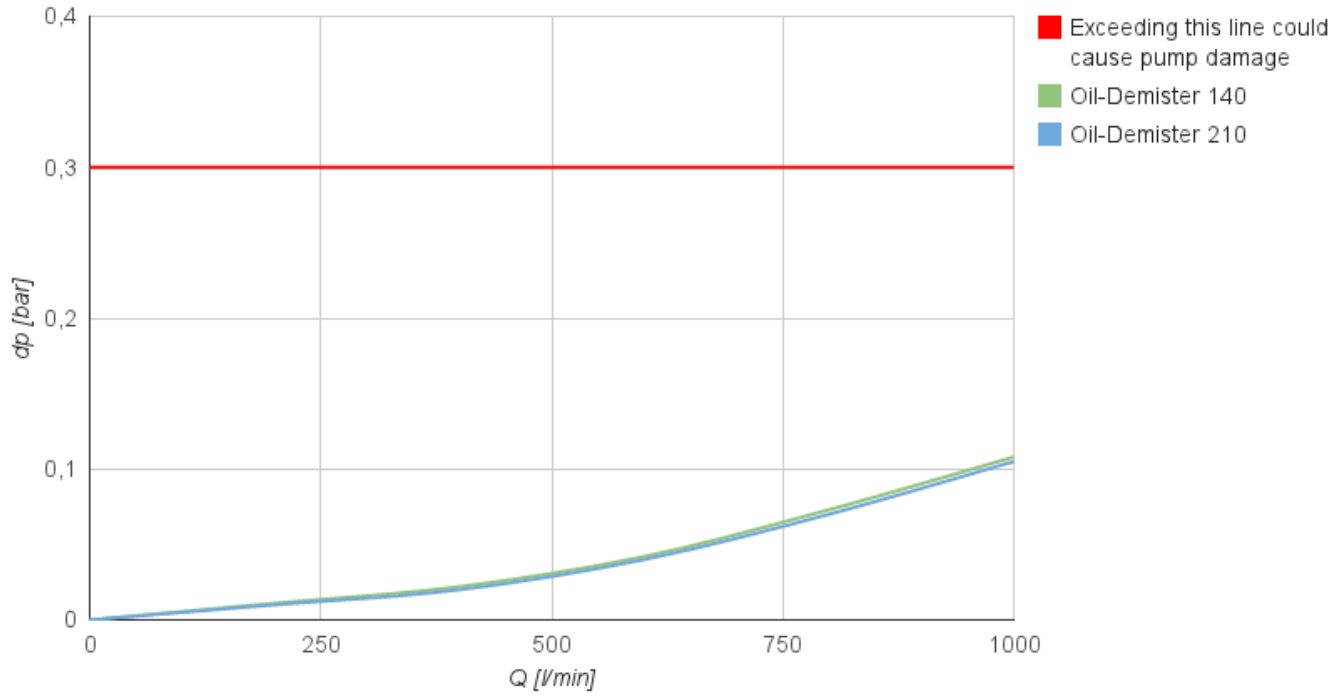
TYPE 140

TYPE 210

Airflow test into a tank



Airflow out of a tank



Ordering Code

AIR CONDITIONERS SPARE PARTS AND ACCESSORIES

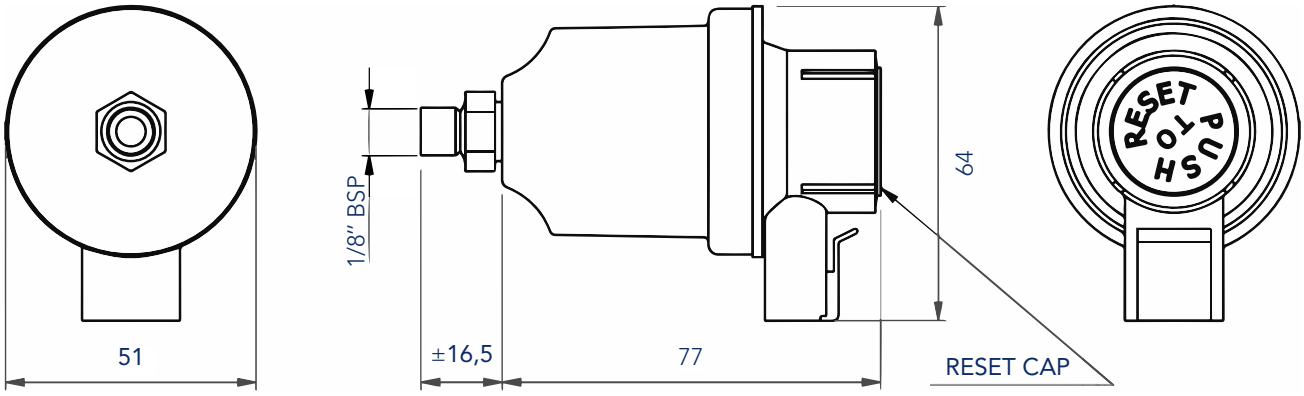
SPARE PARTS	ORDERING CODE			
DESCRIPTION	ACL93 AND KL93 SERIES	ACL96 AND KL96 SERIES	KL121 SERIES	KL122 SERIES
Air filter spin-on	KL90 (incl. seal)		KL120 (incl. seal)	
Stainless steel air filter spin-on	N.A.		KL120S (incl. seal)	
Stainless steel air filter only	N.A.		120S (incl. seal)	
ZR-gel refill in air tight container	KL/ACL 93 series refill ZR-gel 300 cc	KL/ACL 96 series refill ZR-gel 600 cc	KL121 series refill ZR-gel 1000 cc	KL122 series refill ZR-gel 2000 cc
ZR-gel refill in air tight container	Refill ZR gel 4000 cc			
Active coal refill in air tight container[1]	300 cc	300 cc	300 cc	600 cc
Spare kit including ZR-gel, air filter spin-on, seal and foam pads	Spare kit KL93R/ ACL93R	Spare kit KL96R/ ACL96R	Spare kit KL121R	Spare kit KL122R
[1] Please note that smallest Active coal refill available is 300 cc container. To be used for 93, 96 and 121 series				

ACCESSORIES	ORDERING CODE				
DESCRIPTION	ACL93 AND ACL96 SERIES	KL93 AND KL96 SERIES	ACL121 SERIES	KL121 SERIES	KL122 SERIES
Filter minder (indicator + electr. contact and nipple)	9331303				
Filter minder connector (w/o cable) for use with 9331303	9331320				
Mounting plate	KL92		KL1202		
Mounting plate + filter minder port	KLS91	KL95	KLS1201	KL1205	
Mounting plate + filter minder port + return port	KL91		KL1201		
Mounting plate + filter minder port + Suction and return port	KL91SR		N.A.		
Barrel Adapter	KL75		N.A.		
Pressurised Tank Adapter	KL98		N.A.		
Mounting plate with check valves	N.A.		KL1200V		
Oil-Demister small	140		N.A.		
Oil-Demister large	210		N.A.		
Pall to RMF Systems Adaptor	KL99		N.A		

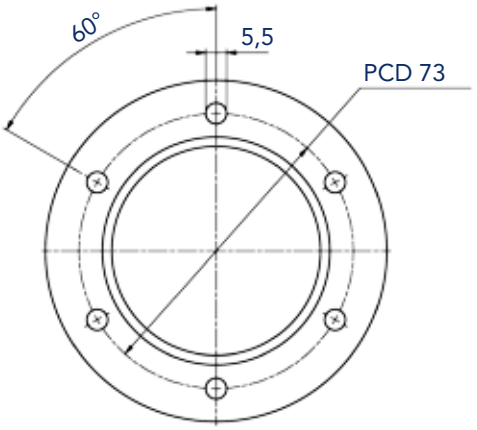
Filter Minder Specifications

The graduated indicator monitors the airfilter. The position indicator progressively fills the window as the air filter restriction increases, looking at the highest restriction.
The airfilter should be changed when the position indicator reaches the red zone.

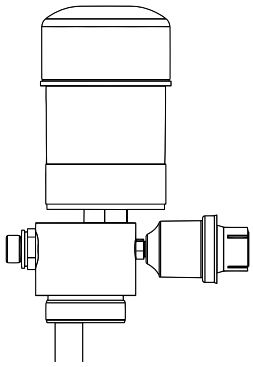
SPECIFICATIONS	
OPERATING TEMP.	-40° C to +120° C
MATERIAL	Polycarbonate Housing
STANDARD CALIBRATION	2 to 8,7 kPa
(VACUUM) FULL SCALE	5,0 kPa (20 IN.)
VACUUM FIRST MOVEMENT	1,5 kPa (6 IN.)
SWITCHING VOLTAGE	300 VDC Max.
VOLTAGE BREAKDOWN	450 VDC Max.
SWITCHING CURRENT	1,20 A Max.
CARRYING CURRENT	0,50 A Max.



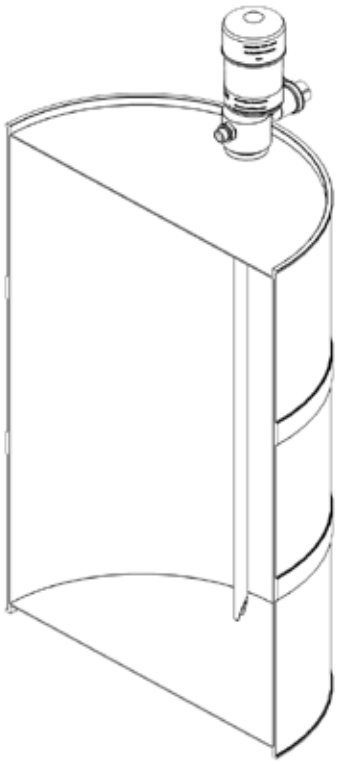
Mounting Plate Dimensions



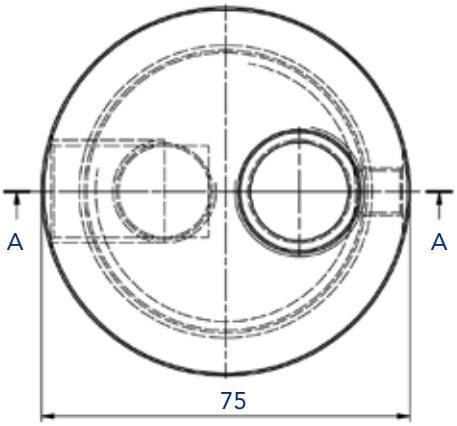
All mounting plates are drilled
according pattern DIN 24557/2

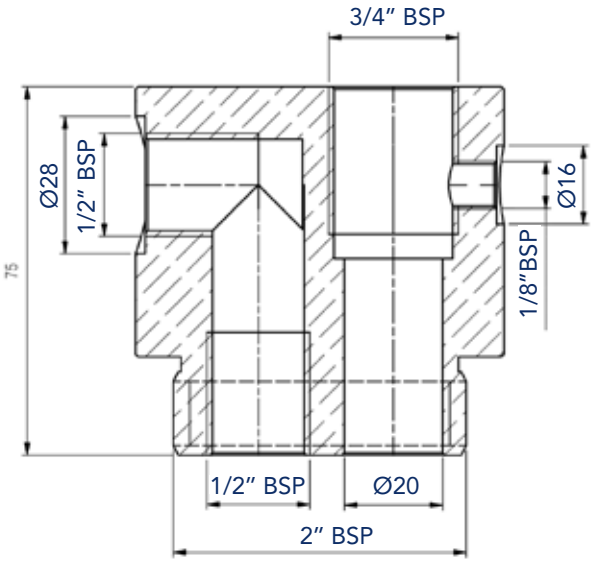


KL 75

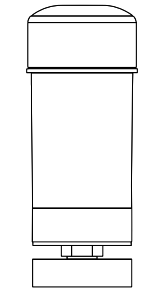


Example KL 75

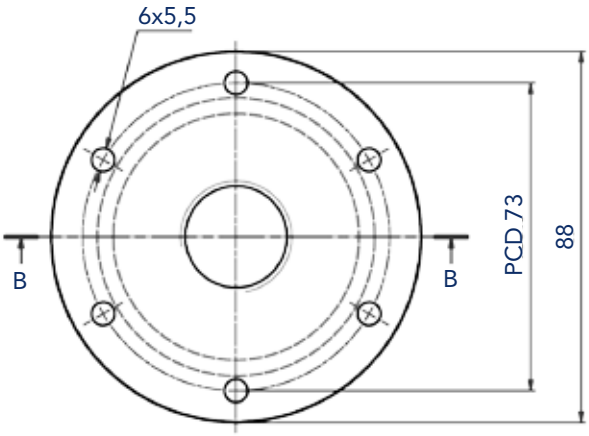




SECTION A - A



KL 92 / 1202



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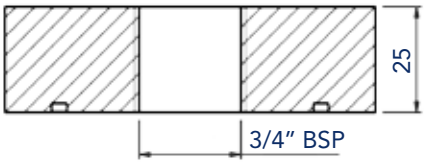

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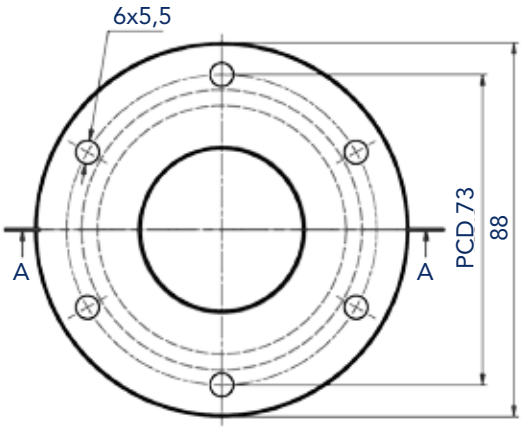
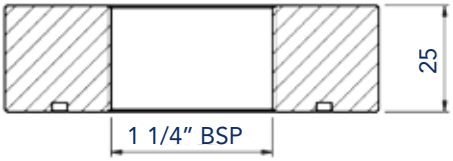


SECTION A - A



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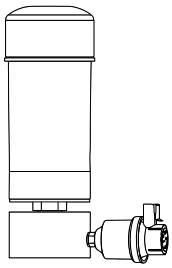
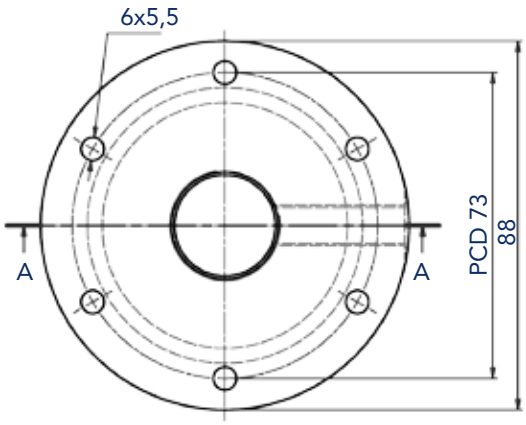
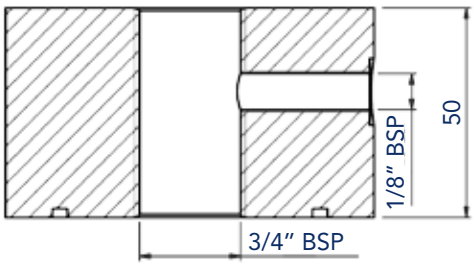


KL 95 / 1205



SECTION A - A



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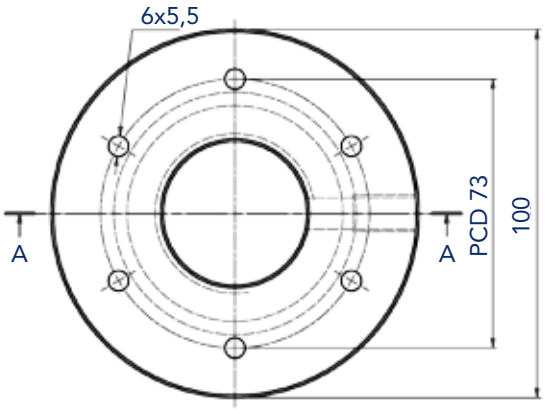
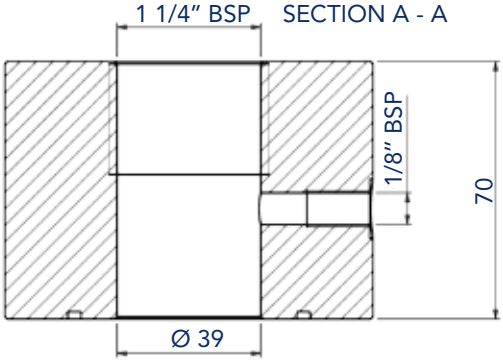


1 1/4" BSP SECTION A - A



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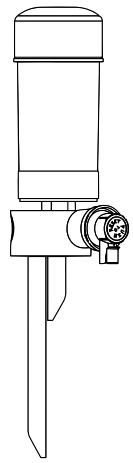
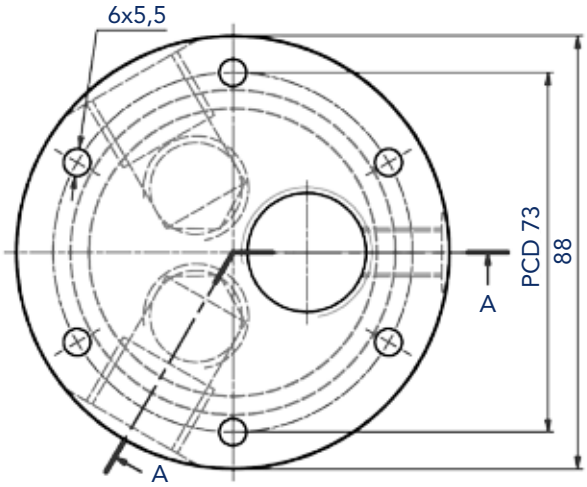
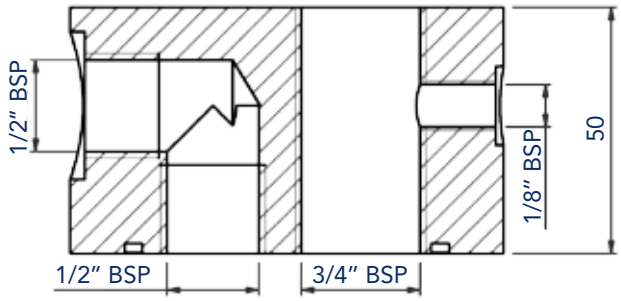
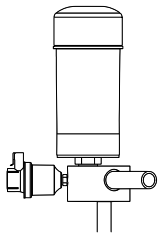


KL 91SR

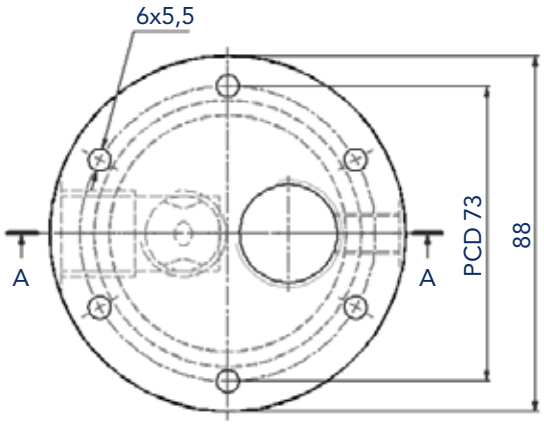


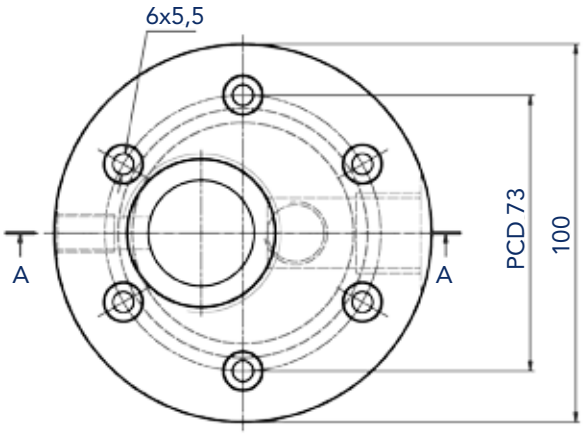
SECTION A - A



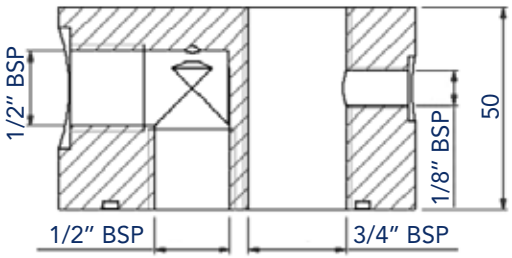


KL 91 /KL 1201



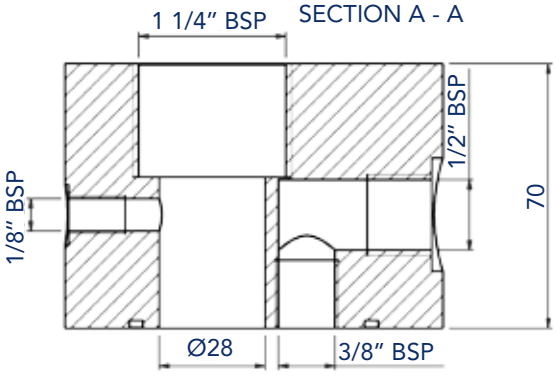


SECTION A - A



KL 91

SECTION A - A



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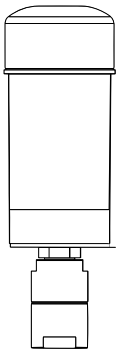

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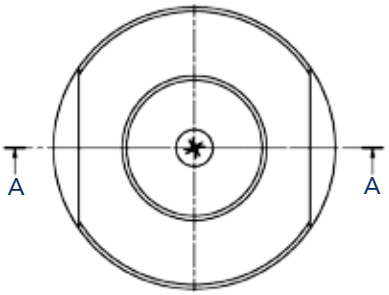
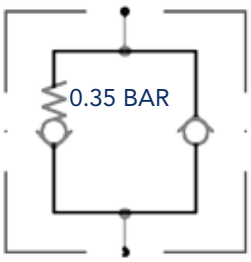
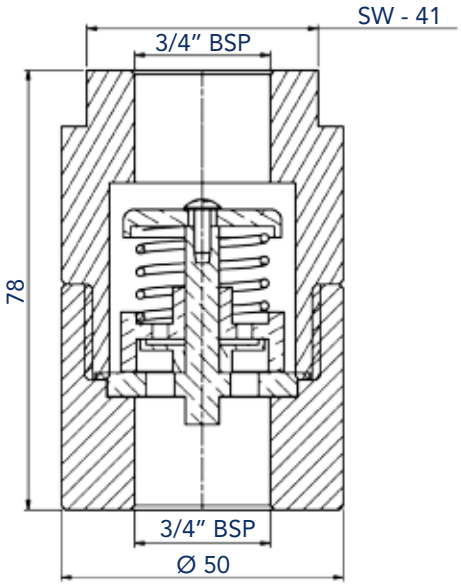
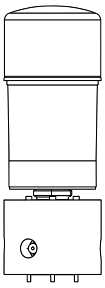


SECTION A - A







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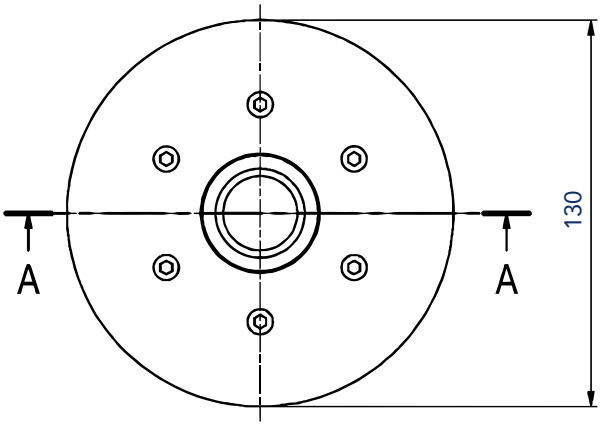
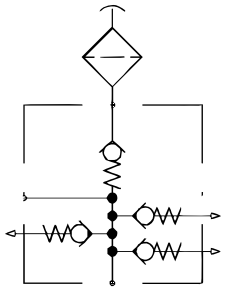
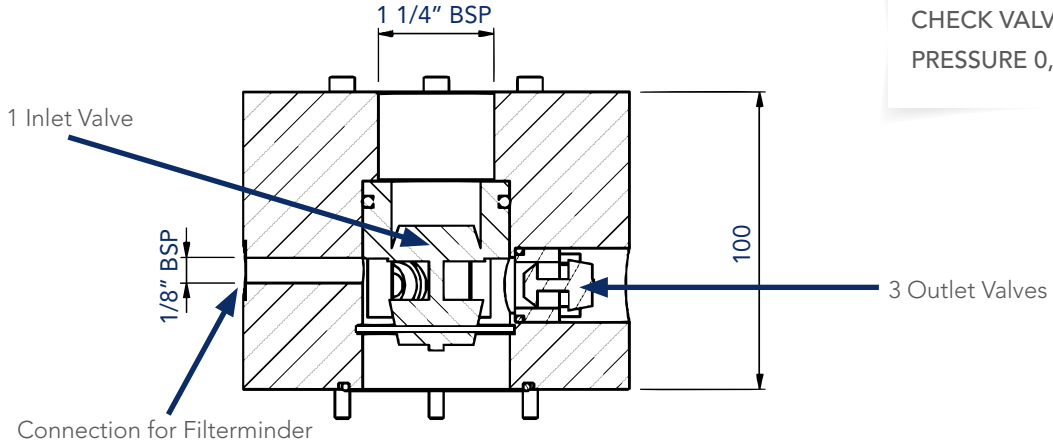
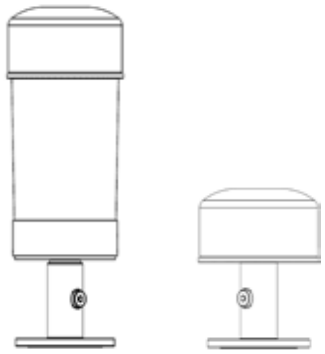




SectionA-A



CHECK VALVE CRACKING PRESSURE 0,01 - 0,02 BAR



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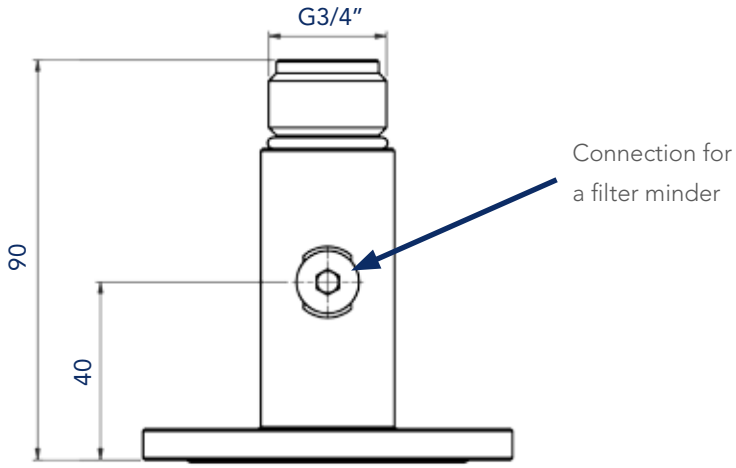

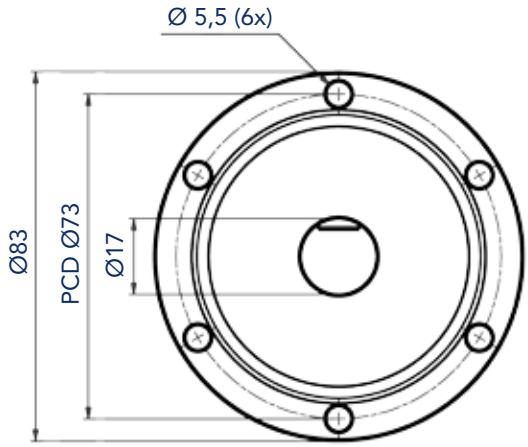

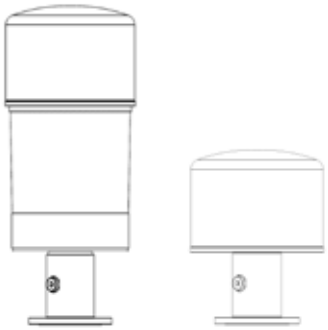

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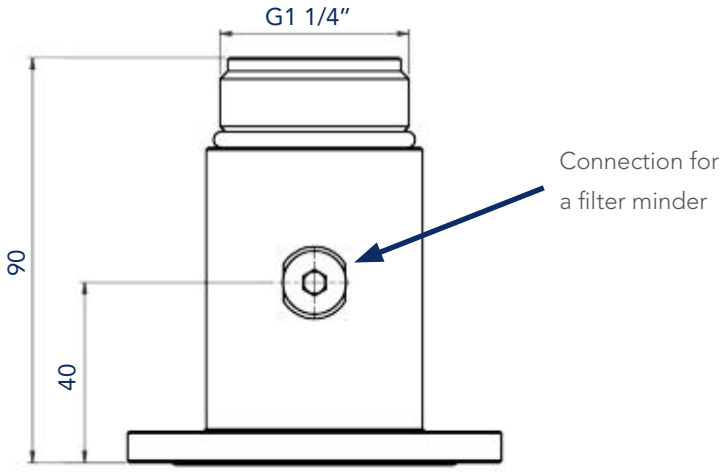

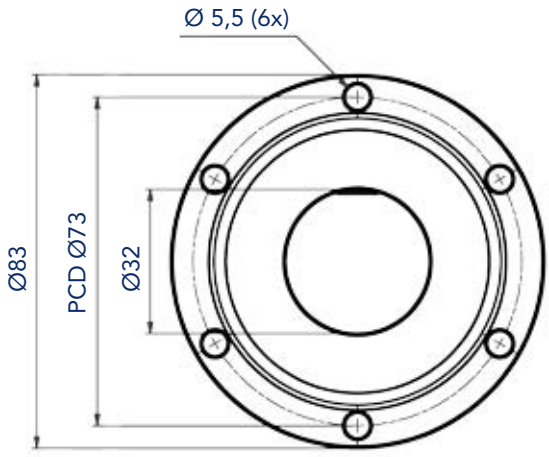

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