

Atlas Copco

Compressed air filters



**DD 10+-550+ - DDh 15+-490+, DDp 10+-550+ - DDhp 15+-490+,
PD 10+-550+ - PDh 15+-490+, PDp 10+-550+ - PDhp 15+-490+,
QD 10+-550+ - QDh 15+-490+, UD 9+-550+**

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DDp 10+-550+ - DDhp 15+-490+,
PD 10+-550+ - PDh 15+-490+,
PDp 10+-550+ - PDhp 15+-490+,
QD 10+-550+ - QDh 15+-490+, UD 9+-550+

Instruction book

Original instructions

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This instruction book is valid for CE as well as non-CE labelled machines. It meets the requirements for instructions specified by the applicable European directives as identified in the Declaration of Conformity.

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1 Safety precautions


1.1 Safety icons

Explanation

	Danger for life
	Warning
	Important note

1.2 Safety precautions during installation

1. Place the device where the ambient air is cool and as clean as possible. Consult section Reference conditions and limitations.
2. During installation or any other intervention on one of the connected machines, the machines must be stopped, de-energized and the isolating switch opened and locked before any maintenance or repair. As a further safeguard, persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the start equipment.
3. Install the equipment in an area free of flammable fumes, vapours and particles, e.g. paint solvents, that can lead to internal fire or explosion.
4. The electrical connections must correspond to the applicable codes. The device must be earthed and protected against short circuits by fuses in all phases. A lockable power isolating switch must be installed near the device.
5. For machines controlled by a central control system, a sign stating "This machine may start without warning" must be affixed near the instrument panel.
6. In multiple compressor systems, manual valves must be installed to isolate each compressor. Non-return valves (check valves) must not be relied upon for isolating pressure systems.
7. Never remove or tamper with the safety devices.

	<p>Also consult following safety precautions: Safety precautions during operation and Safety precautions during maintenance or repair.</p> <p>These precautions apply to electrical devices.</p> <p>For precautions applying to the connected equipment consult the relevant instruction book.</p> <p>Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your device.</p>
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1.3 Safety precautions during operation



All responsibility for any damage or injury resulting from neglecting these precautions, or non-observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

1. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
2. Never operate the device in the presence of flammable or toxic fumes, vapours or particles.
3. Never operate the device below or in excess of its limit ratings.
4. Do not operate the device when there are flammable or toxic fumes, vapors or particles.
5. Keep all bodywork doors and panels closed during operation. The doors may be opened for short periods only, e.g. to carry out routine checks.
6. People staying in environments or rooms where the sound pressure level reaches or exceeds 90 dB(A) shall wear ear protectors.
7. Periodically check that:
 - All guards and fasteners are in place and tight
 - All hoses and/or pipes are in good condition, secure and not rubbing
 - There are no leaks
 - All electrical leads are secure and in good order
8. Never remove or tamper with the safety devices.



Also consult following safety precautions: [Safety precautions during installation](#) and [Safety precautions during maintenance](#) or repair.
 These precautions apply to electrical devices.
 For precautions applying to the connected equipment consult the relevant instruction book.
 Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

1.4 Safety precautions during maintenance or repair



All responsibility for any damage or injury resulting from neglecting these precautions, or non observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

1. Use only the correct tools for maintenance and repair work.
2. Use only genuine spare parts.
3. A warning sign bearing a legend such as "Work in progress - do not start" shall be attached to the starting equipment, including all remote start equipment.
4. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
5. Never use flammable solvents or carbon tetrachloride for cleaning parts. Take safety precautions against toxic vapours of cleaning liquids.
6. Scrupulously observe cleanliness during maintenance and repair. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape.

7. Never use a light source with open flame for inspecting the interior of the device.
8. All regulating and safety devices shall be maintained with due care to ensure that they function properly. They may not be put out of action.
9. Before clearing the device for use after maintenance or repair, check that operating pressures, temperatures and time settings are correct. Check that all control and shut-down devices are fitted and that they function correctly.
10. Make sure that no tools, loose parts or rags are left in or on the device.
11. Never use caustic solvents which can damage materials of the device.



Also consult following safety precautions: [Safety precautions during installation](#) and [Safety precautions during operation](#).
 These precautions apply to electrical devices.
 For precautions applying to the connected equipment consult the relevant instruction book.
 Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.



Units and/or used parts should be disposed of in an environmentally friendly and safe manner and in line with the local recommendations and legislation.

2 Description

2.1 Description of filters

Description of filters



84092D

Type	Description	Max. compressed air inlet pressure	Air flow	Differential pressure indicator (1)	Differential pressure gauge (2)
DD+	<ul style="list-style-type: none"> coalescing filters for general purpose protection, removing solid particles, liquid water and oil aerosol total mass efficiency: 99.3% 	16 bar	from inside to outside	size 10+ up to 35+	size 50+ up to 550+
DDh+		20 bar		-	all sizes
PD+	<ul style="list-style-type: none"> high efficiency coalescing filters, removing solid particles, liquid water and oil aerosol total mass efficiency: 99.92% 	16 bar	from inside to outside	size 10+ up to 35+	size 50+ up to 550+
PDh+		20 bar		-	all sizes
UD+	<ul style="list-style-type: none"> high efficiency coalescing filters, removing solid particles, liquid water and oil aerosol total mass efficiency: 99.99% 	16 bar	from inside to outside	size 9+ up to 25+	size 45+ up to 550+

Type	Description	Max. compressed air inlet pressure	Air flow	Differential pressure indicator (1)	Differential pressure gauge (2)
DDp+	<ul style="list-style-type: none"> particulate filters for dust protection count efficiency: 99.92% at most penetrating particle size 	16 bar	from outside to inside	size 10+ up to 35+	size 50+ up to 550+
DDhp+		20 bar		-	all sizes
PDp+	<ul style="list-style-type: none"> high-efficiency particulate filters for dust protection count efficiency: 99.98% at most penetrating particle size 	16 bar		size 10+ up to 35+	size 50+ up to 550+
PDhp+		20 bar		-	all sizes
QD+	<ul style="list-style-type: none"> oil vapour and odour removal filter air flows through the activated carbon which is contained in the QD filter element and which absorbs oil vapours and odours 	16 bar	from inside to outside or from outside to inside	-	-
QDh+		20 bar		-	-



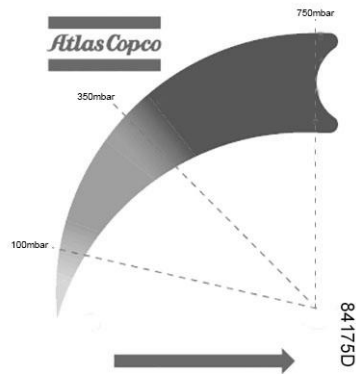
The QD+/QDh+ filter does not remove methane, carbon monoxide, carbon dioxide or other toxic gases and fumes!

(1) At start-up and during normal operation, the differential pressure indicator will be yellow; it turns partially red when the pressure drop of the filter increases.



(2) The differential pressure gauge indicates the pressure drop by a color scale which gradually changes from yellow to orange to red which corresponds to an absolute scale of 0 to 750mbar.





Scale indicates the actual pressure reading

Refer to section 4.3 on the correlation between the differential pressure indicator or gauge reading and the service intervals.

2.2 Options

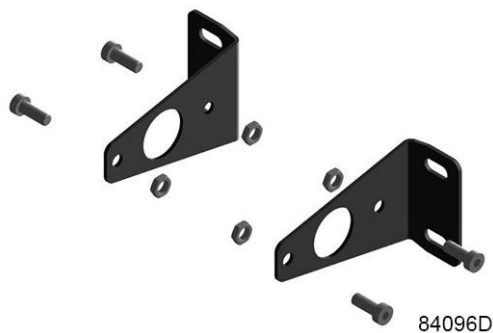
Filter connection kit

If two or more filters are used in combination, build the filter heads together by means of a serial connection in the correct air flow direction. An arrow for the air flow direction is shown on the filter head or on the differential pressure indicator and gauge.



Wall mounting kit

For wall mounting, a special set is available as option. Fit the mounting brackets with bolts, washers and nuts to a solid frame within easy reach, leaving sufficient space for maintenance and service.



Voltage-free contact

A voltage-free switch, mounted in the differential pressure gauge, closes at a pressure drop of 0.35 bar (5 psi) and can be used for remote control or alarm purposes.



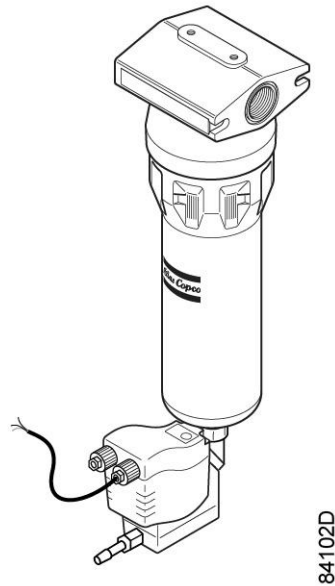
Drain connection

Quick couplings are available to make easy connection of the automatic drain valve possible. These couplings are not available for the high pressure filters (DDh+/DDhp+/PDh+/PDhp+/QDh+).



Electronic drain

The electronic drain is optional on the DD+, PD+ and UD+ filters. It is not available on any high pressure filter (DDh+/DDhp+/PDh+/PDhp+/QDh+).



84102D

The electronic drain is a zero loss, electronically operated drain valve, specially designed to drain oil condensate. A sensor senses the condensate level. If this level exceeds a preset value, the drain waits for a fixed programmed time, then a solenoid valve is activated and the condensate is discharged. When all the condensate is discharged, the solenoid valve closes and condensate is collected again. This way, the loss of air is reduced to a minimum.

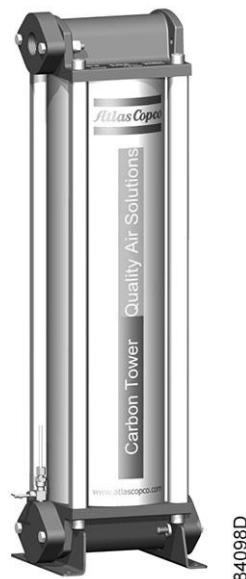
If the microcontroller registers a malfunction, the automatic drain valve will automatically change to alarm mode. This alarm signal can be relayed via a potential-free contact.

The electronic drain is available for 3 operating voltages: 220 V, 115 V and 24 V. An extra electric wiring can be foreseen to connect the potential free contacts and an external test button.



Always remove the manual drain or the automatic drain of the filter before installing the electronic drain.

Activated Carbon Tower QDT



84098D

QDT filters are designed for the removal of **oil vapours and odours** from compressed air.

The air flows through the activated carbon which is contained in the QDT filter element and which adsorbs oil vapours and odours. The QDT has to be preceded by a DD+ and PD+ filter or an UD+ filter. A DDp+ or a DDp+-PDp+ filter can be installed downstream a QDT to improve air purity.

QDT filters adsorb all oil and most of the organic volatile compounds in the air.

Some volatile organic substances are more difficult to remove. As an example, this filter does not remove methane, carbon monoxide, carbon dioxide and some other toxic gases and fumes. Therefore air from the QDT can not always directly be used for breathing purposes.

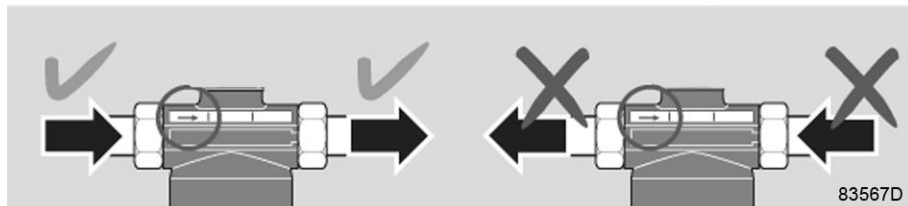
For more information on QDT 20-310, refer to Instruction book 29xx 7090 71.

3 Installation

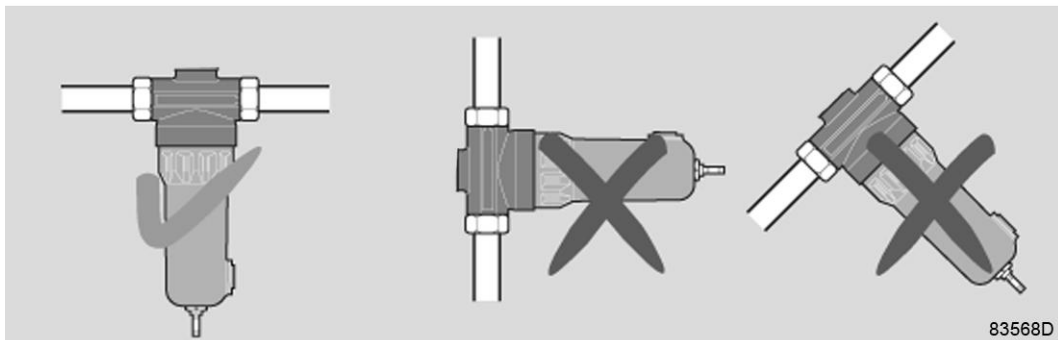
3.1 General remarks

When installing the filter, keep in mind the following:

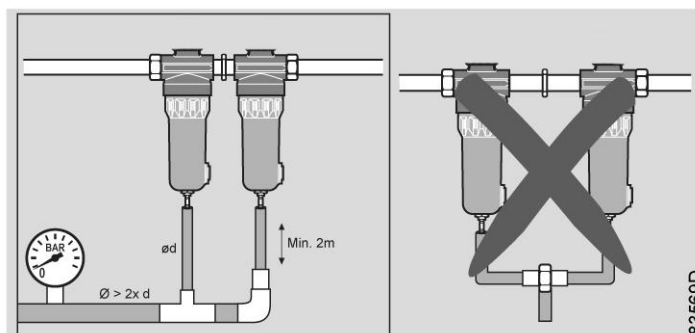
- Be sure that the piping is internally clean, especially downstream of the filter.
- Sizing of filter should be done carefully taken into account the application requirements. Maximum flow capacity, as listed in Chapter 5.4 or 6.4 "Rated flow at reference conditions", should never be exceeded to make sure that filtration performance and filter lifetime are guaranteed.
- Take into account the flow direction:



- The filters must be mounted vertically:



- If the unit is integrated in a multiple line system, provide isolating valves and (if required) a bypass.
- The automatic drain has a special connection allowing easy installation of a hose or a quick coupling to pipe away the drained liquid. This drained liquid should be fed into a non-pressurized vessel or drain pipe. In case two filters are installed next to each other, the drain pipe length per filter should be at least 2 meters before connecting them together. The pipe diameter of the collector should be at least twice the diameter of the pipes connected to the filter drain.



- Open and close isolating valves slowly, as a sudden pressure rise or pressure drop can cause irreversible damage to the filter element.

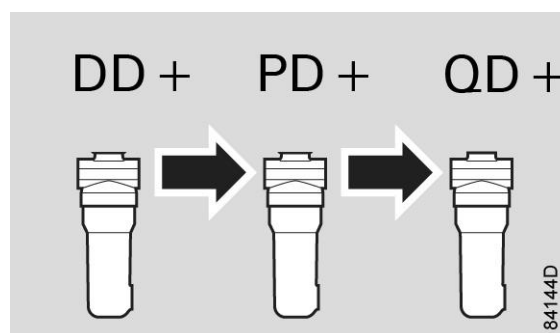
3.2 Specific remarks

DD+/DDh+ filter

The filter should be preceded by a water separator if no water separator is integrated in the after cooler of the compressor. In case a dryer is preceding the filter, a water separator is no longer required.

PD+/PDh+ filter

It is recommended to install a DD+/DDh+ filter upstream the PD+/PDh+ filter. If not, the load on the PD+/PDh+ filter element may become too high and will reduce its lifetime.



DDp+/DDhp+ and PDp+/PDhp+ filter

When the DDp+/DDhp+ and PDp+/PDhp+ filters are used with an adsorption type air dryer, install the filter downstream of the dryer.

UD+ filter

The filter should be preceded by a water separator if no water separator is integrated in the after cooler of the compressor. In case a dryer is preceding the filter, a water separator is no longer required.

QD+/QDh+ filter

To protect the active carbon element, a QD+/QDh+ filter must always be preceded by a DD+/DDh+ filter and a PD+/PDh+ filter.

The filter should be mounted as close as possible to the point of use of the air.

3.3 ISO 8573-1:2010

General

For new installations as well as for installations that have to be made up-to-date, the ISO 8573-1:2010 standard can be used. Some proposals are given fulfilling this standard.

This part specifies purity classes of compressed air with respect to particles, water and oil, independent of the location in the compressed air system at which the air is specified or measured, for ISO 8573-1:2010 standard.



The ISO 8573-1:2010 standard only concerns compressed air for general use and does not deal with, or is not applicable to, e.g. breathing air.

ISO class	Dust			Water		Oil
	Maximum number of particles per m ³ as function of particle size <i>d</i>			Pressure dew point		Total oil concentration (aerosol, liquid and vapour) mg/m ³
	0.1< <i>d</i> ≤0.5 μm	0.5< <i>d</i> ≤1.0 μm	1.0< <i>d</i> ≤5.0 μm	°C	°F	
0	As specified by the equipment user or supplier and more stringent than class 1					
1	≤ 20000	≤ 400	≤ 10	≤ -70	≤ -94	≤0.01
2	≤ 400000	≤ 6000	≤ 100	≤ -40	≤ -40	≤0.1
3	not specified	≤ 90000	≤ 1000	≤ -20	≤ -4	≤1
4	not specified	not specified	≤ 10000	≤ +3	≤ +37.4	≤5
5	not specified	not specified	≤ 100000	≤ +7	≤ +44.6	-
6	mass concentration: 1 - 5 mg/m ³			≤ +10	≤ +50	-

Terms and definitions

Particle: small discrete mass of solid or liquid matter

Particle size *d* : length of the greatest distance between two external boundaries

Dew point: temperature at which water vapour begins to condense

Pressure dew point: dew point of the air at the specified pressure

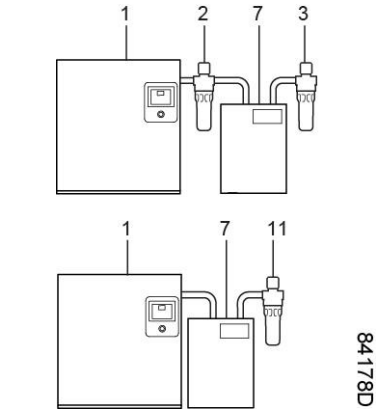
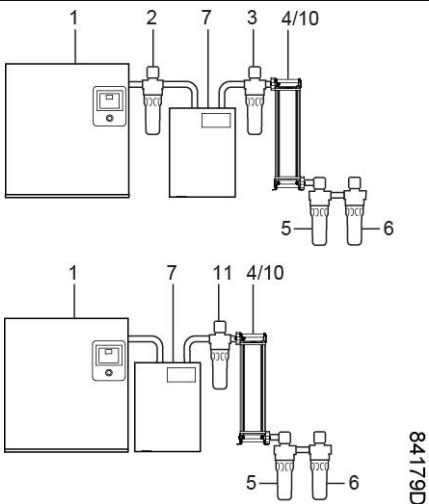
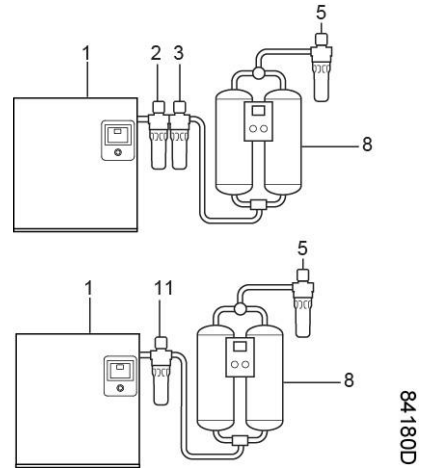
A desiccant dryer will be needed to reduce the dew point down to -40 °C (-40°F).

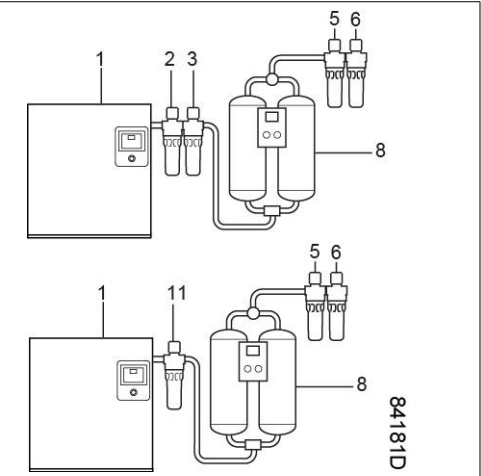
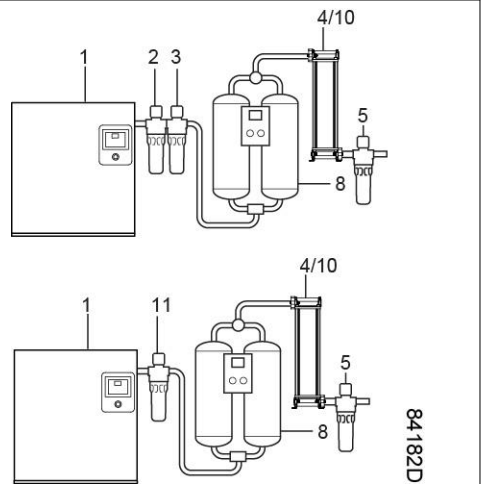
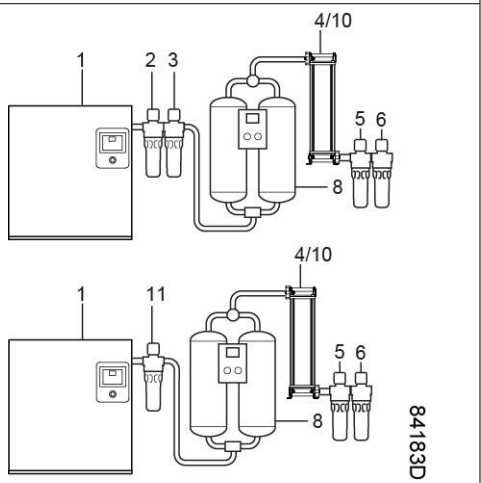
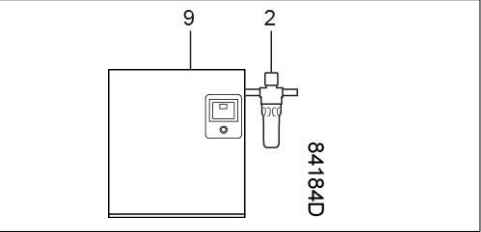
The air purity according to ISO 8573-1:2010 is expressed as follows: class [X.Y.Z], where X, Y and Z are respectively the purity classes with regard to dust, water and oil.

A few examples are given in the image below.

Note that for examples D, E, G and H, the filter combination DD+ filter (2) and PD+ filter (3) can be replaced by an UD+ filter (11).

A	Air purity class ISO 8573-1:2010 [2:-:3]	
B	Air purity class ISO 8573-1:2010 [2:4:3]	

C	Air purity class ISO 8573-1:2010 [1:4:2]	 <p>84178D</p>
D	Air purity class ISO 8573-1:2010 [1:4:1]	 <p>84179D</p>
E	Air purity class ISO 8573-1:2010 [2:2:2]	 <p>84180D</p>

F	Air purity class ISO 8573-1:2010 [1:2:2]	
G	Air purity class ISO 8573-1:2010 [2:2:1]	
H	Air purity class ISO 8573-1:2010 [1:2:1]	
I	Air purity class ISO 8573-1:2010 [2:-:0]	

J	Air purity class ISO 8573-1:2010 [1:-:0]	
K	Air purity class ISO 8573-1:2010 [2:4:0]	
L	Air purity class ISO 8573-1:2010 [2:2:0]	
M	Air purity class ISO 8573-1:2010 [1:2:0]	

Components shown in above image

Item	Description	Item	Description
1	Oil-injected compressor Compressor should be equipped with a free water separation system (for example after cooler incl. drain or a water separator (WSD)). No free water should enter the filtration system.	7	FD refrigerant dryer
2	DD+/DDh+ filter	8	CD desiccant dryer
3	PD+/PDh+ filter	9	Oil-free compressor Compressor should be equipped with a free water separation system (for example after cooler incl. drain or a water separator (WSD)). No free water should enter the filtration system.

Item	Description	Item	Description
4	QD+/QDh+ filter	10	QDT filter (for critical applications)
5	DDp+/DDhp+ filter	11	UD+ filter
6	PDp+/PDhp+ filter	-	-

Compressed air may come into direct or indirect contact with food. When this happens, for example during production or processing, this requires a much higher level of contaminant control. Particular attention needs to be given to contaminants added during the compression and the distribution process, such as bread packaging, fluidized bed in the transfer of flour from a tanker etc.

Recommendations:

- No contact: Air purity class ISO 8573-1:2010 [1:4:1]
- Contact: Air purity class ISO 8573-1:2010 [1:2:1]

The filters comply with the bacteriological filtration grade and the British Compressed Air Society (BCAS) Food Grade Compressed Air Code of Practice.

3.4 ISO 12500

ISO 12500

ISO 12500 has been introduced specifically to test purification equipment for compressed air and complements ISO 8573.

ISO 12500 currently consists of:

- Part 1: Oil aerosol filters
- Part 2: Oil vapor filters
- Part 3: Particulate filters
- Part 4: Water removal

ISO 12500-1:2007 - Testing of Coalescing filters

ISO 12500-1:2007 provides a set of standardized conditions with which coalescing filters should be tested in order to show their filtration performance in accordance with ISO 8573-1:2010. The testing will provide the user with an oil aerosol carry-over figure in mg/m³ and saturated (or wet) pressure drop in mbar. This is the filter performance at the reference conditions and can be used for benchmarking purposes.

ISO 12500-3:2009 - Testing of Dust removal filters

ISO 12500-3:2009 provides a guide for choosing an appropriate method of determining the solid particulate removal efficiency rating by particle size. Measurement methods are recommended based on the size range of the particulates that the filter being tested has been designed to remove. The test is performed as a type-test on filters as being representative of a range.

4 Maintenance

4.1 Maintenance

When maintaining the filter, keep in mind the following:

- On filters with manual drain valve, open the latter at regular intervals to evacuate collected dust or liquid.
- In case an automatic drain valve or a solenoid timer drain is installed, manual draining can be carried out by turning the connection nipple of the automatic drain valve counterclockwise.



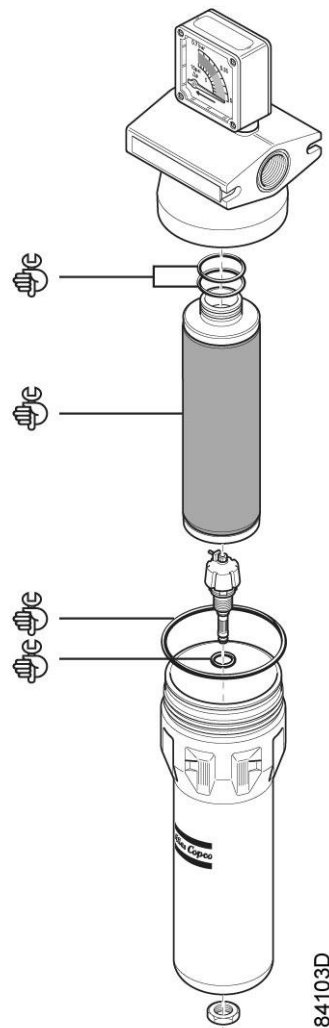
When the filter has to process air with a temperature higher than the specified maximum temperature, the filter's lifetime will be reduced considerably!

4.2 Filter element change



The hand-tool icon on the figure indicates the items provided in a dedicated filter kit.

1. Before filter element change, check for any leakages at the bottom of the filter bowl (connection of manual and automatic drain) during normal filter operation. If no leakage is observed, point 6 up to 9 can be discarded.
2. Isolate the filter from the air net.
3. Depressurize the filter by turning the connection nipple of the automatic drain valve counterclockwise or by opening the manual drain valve.
4. Unscrew the bowl. A whistling noise will warn you if the bowl is not fully depressurized. If this occurs, the bowl should be screwed back and the venting should be repeated.
5. Discard the filter element.



6. Remove the drain valve by unscrewing the retaining nut underneath the bowl.
7. Remove the O-ring from the bowl and clean the bowl. Position a new O-ring on the bowl.
8. Remove the O-ring from the drain valve and position a new O-ring on the drain valve. The latter is supplied with each new filter kit.
9. Reinstall the drain valve in the bowl using the retaining nut (tightening torque 3 Nm).
10. Reposition the new filter element with the 2 new O-rings.
11. Screw the bowl completely on the head.



A small amount of acid-free vaseline may be applied to screw threads and O-rings to facilitate the assembly.

4.3 Service intervals

DD+/DDp+, DDh+/DDhp+, PD+/PDh+, PDp+/PDhp+, UD+

The filter elements of oil mist filters (DD+/PD+/DDh+/PDh+/UD+) should be replaced after 4000 hours.

The gauge or pop-up is not a measure, as a typical oil mist filter operates in the steady state mode during its life and this mode is e.g. 200-250 mbar.

Note that the indicator or gauge will not move into the red area but will stay yellow or orange during operation.

The filter elements of dust filters (DDp+/PDp+/DDhp+/PDhp+) should be replaced after 4000 hours or when the pressure drop reaches 350 mbar (whatever comes first).

The pressure drop is reached when the indicator or gauge turns red.

Summarizing, the following service intervals should be observed (whatever comes first):

- 4000 operating hours
- 12 months in use
- Pressure drop: 350 mbar

QD+/QDh+

For QD+/QDh+ filters, the change interval of the adsorption element is approximately 1000 operating hours or yearly. Its pressure drop will not increase during its useful life. Nevertheless, the adsorption element must be changed earlier at the first signs of oil vapor and odor.

4.4 Filter disposal

Used filters must be disposed of in an environmentally friendly and safe manner, and in line with the local recommendations and environmental legislation.

5 Technical data 16 bar filters

5.1 Reference conditions

Air inlet pressure	7 bar(e)	102 psig
Air inlet temperature	20 °C	68 °F
Ambient temperature	20 °C	68 °F

5.2 Principal data

Maximum compressed air inlet pressure	16 bar(e)	232 psig
Minimum compressed air inlet pressure	1 bar(e)	15 psig
Minimum compressed air inlet temperature	1 °C	34 °F
Maximum compressed air inlet temperature for QD+	35 °C	95 °F
Minimum ambient temperature	1 °C	34 °F
Maximum ambient temperature for QD+ filters.	35 °C	95 °F
Maximum ambient temperature for other types	65 °C	149 °F
Maximum recommended pressure drop (not for QD+ filters)	0.35 bar(e)	5 psig

5.3 Specific data

DD+/PD+ filter

		DD+		PD+		
Challenge/inlet oil concentration	mg/m ³	3	10	0.1	3	10
Dry pressure drop filter element	mbar	60		75		
Wet pressure drop filter element	mbar	150	155	165	185	190
Dry pressure drop filter	mbar	85		100		
Wet pressure drop filter	mbar	170	180	190	210	215
Oil carry-over (aerosol)	mg/m ³	0.02	0.07	< 0.001	0.002	0.008
Total mass efficiency	%	99.3		99.92		
Remark		Typical installation (1)		Typical installation (1)		
Air purity class ISO 8573-1:2010		[2:-:3]		[1:-:2]		

(1) Typical installation: Compressor + refrigerant dryer/WSD + DD+ + PD+

UD+ filter

		UD+	
Challenge/inlet oil concentration	mg/m ³	3	10
Dry pressure drop filter element	mbar	115	
Wet pressure drop filter element	mbar	210	215
Dry pressure drop filter	mbar	145	
Wet pressure drop filter	mbar	240	245
Oil carry-over (aerosol)	mg/m ³	0.0003	0.0009
Total mass efficiency	%	99.99	99.99
Remark		Typical installation (2)	
Air purity class ISO 8573-1:2010		[1:-:2]	

(2) Typical installation: Compressor + refrigerant dryer/WSD + UD+

QD+ filter

		QD+
Challenge/inlet oil concentration (aerosol)	mg/m ³	0.01
Dry pressure drop filter element	mbar	130
Wet pressure drop filter element	mbar	-
Dry pressure drop filter	mbar	140
Wet pressure drop filter	mbar	-
Oil carry-over (aerosol+vapor)	mg/m ³	0.003
Total mass efficiency	%	-
Efficiency (total count)	%	-
Remark		After DD+-PD+
Air purity class ISO 8573-1:2010		[-:-:1]

DDp+/PDp+ filter

			DDp+	PDp+
Initial pressure drop filter element	mbar		60	75
Initial pressure drop filter	mbar		85	100
Count efficiency	%	MPPS ^a	(MPPS ^a = 0.1 µm) 99.92	(MPPS ^a = 0.06 µm) 99.98
		1 µm	99.998	> 99.999
		0.01 µm	99.93	99.995
Remark			ISO-12500-3:2009	ISO-12500-3:2009
Air purity class ISO 8573-1:2010			[2:-:-]	[1:-:-] ^b

a) MPPS: Most Penetrating Particle Size

b) If preceded by a DDp+

5.4 Rated flow at reference conditions


DD+/DDp+, PD+/PDp+, QD+

Type	10+	20+	35+	50+	70+	100+	130+	170+	210+	310+	425+	550+
l/s	10	20	35	50	70	100	130	170	210	310	425	550
cfm	21	42	74	106	148	212	275	360	445	657	901	1165

UD+

Type	9+	15+	25+	45+	60+	100+	140+	180+	220+	310+	425+	550+
l/s	9	15	25	45	60	100	140	180	220	310	425	550
cfm	19	32	53	95	127	212	297	381	466	657	901	1165

5.5 Correction factors

	When the actual working pressure differs from the reference pressure, multiply the nominal capacity of the filter with the corresponding correction factor to obtain the correct capacity.
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Working pressure bar(e)	1	2	3	4	5	6	7	8	10	12	14	16
Working pressure psig	15	29	44	58	73	87	102	116	145	174	203	232
correction factor	0.38	0.53	0.65	0.75	0.83	0.92	1	1.06	1.20	1.31	1.41	1.5

5.6 Dimensions and weight

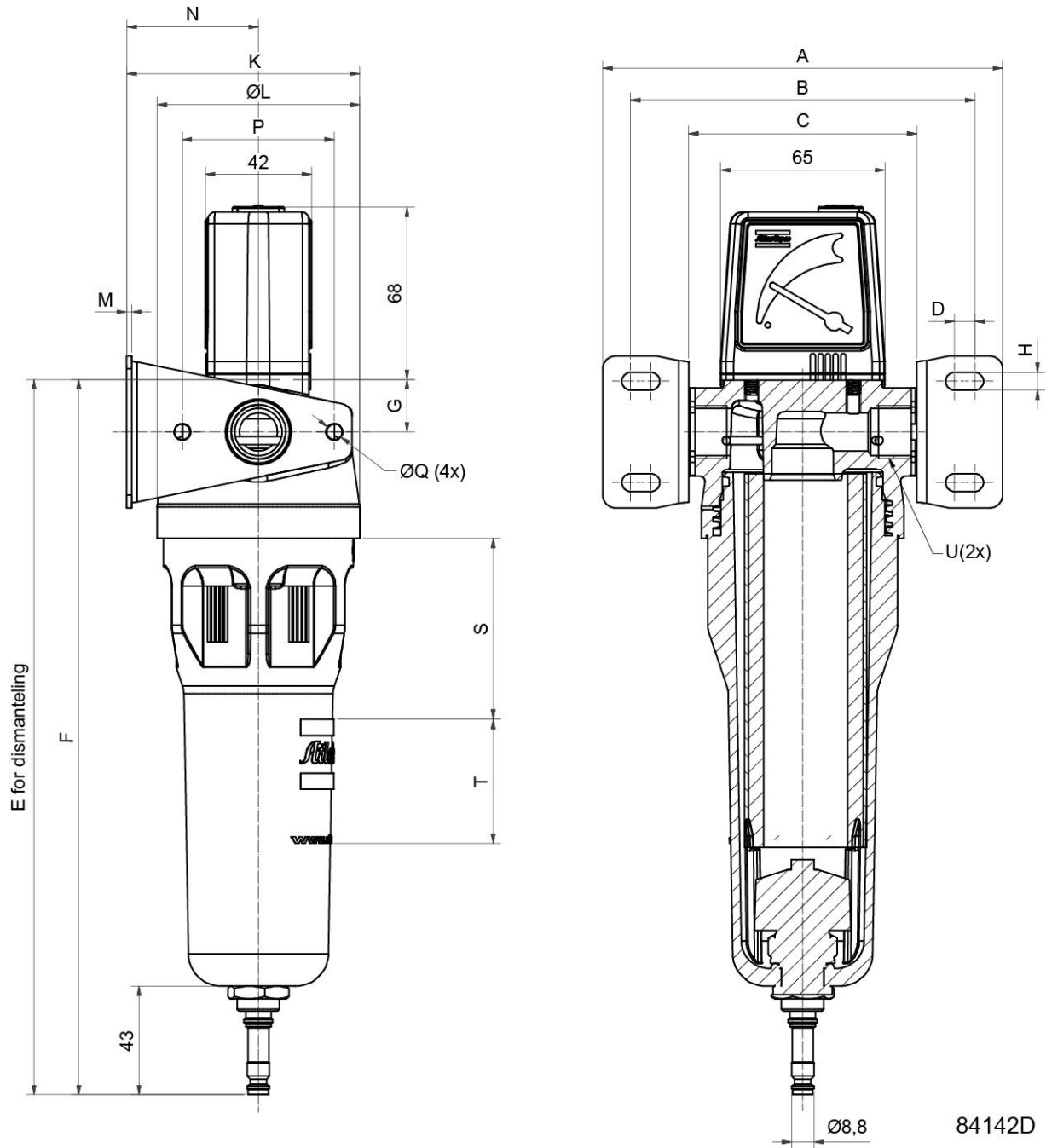
Type		A	B	C	D	E	F	G	H	J	K
DD+, DDp+, PD+, PDp+, QD+	UD+	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
10+	9+	158	136	90	8	303	228	21	7	20	92
20+	15+	158	136	90	8	303	228	21	7	20	92
35+	25+	158	136	90	8	358	283	21	7	20	92
50+	45+	190	168	110	5	378	303	27.5	10	30	118

Type		A	B	C	D	E	F	G	H	J	K
DD+, DDp+, PD+, PDp+, QD+	UD+	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
50+	45+	190	168	110	5	378	303	27.5	10	30	118
70+	60+	190	168	110	5	418	343	27.5	10	30	118
100+	100+	240	218	140	5	484	384	34	10	42	157.5
130+	140+	240	218	140	5	549	449	34	10	42	157.5
170+	180+	240	218	140	5	632	532	34	10	42	157.5
210+	220+	240	218	140	5	632	532	34	10	42	157.5
310+	310+	279	251	179	8	768	618	50	12	42	183
310+	310+	279	251	179	8	768	618	50	12	42	183
425+	425+	320	288	210	9	920	720	57	15	50	230.5
550+	550+	320	288	210	9	1090	890	57	15	50	230.5

Type		L	M	N	P	Q	R	S	T	U	Net mass
DD+, DDp+, PD+, PDp+, QD+	UD+	mm	mm	mm	mm	mm	mm	mm	mm	"	kg
10+	9+	80	2	52	60	6.6	14	65	40	3/8	1
20+	15+	80	2	52	60	6.6	14	65	52	1/2	1.1
35+	25+	80	2	52	60	6.6	14	65	52	1/2	1.3
50+	45+	100	2	68	76	9	15	70	56	3/4	1.9
50+	45+	100	2	68	76	9	15	70	56	1	1.9
70+	60+	100	2	68	76	9	15	70	56	1	2.1
100+	100+	131	2.5	92	103	9	20	98	78	1 1/2	3.7
130+	140+	131	2.5	92	103	9	20	98	78	1 1/2	4.2
170+	180+	131	2.5	92	103	9	20	100	80	1 1/2	4.5
210+	220+	131	2.5	92	103	9	20	100	80	1 1/2	4.6
310+	310+	166	2.5	100	135	11	24	159	128	2	6.9
310+	310+	166	2.5	100	135	11	24	159	128	2 1/2	6.9
425+	425+	191	4	135	155	11	30	162	130	3	11
550+	550+	191	4	135	155	11	30	150	120	3	12.6

Dimension U is G (ISO 228/1) or NPT (ANSI B1.20.1) - thread.

Dimension E indicates the space needed for dismantling.



5.7 Supplied components

The table below gives an overview of the components provided on the different types of filters.

Abbreviations:

- PDI Pressure Differential Indicator
- PDG Pressure Differential Gauge
- AD Automatic drain
- MD ... Manual Drain

DD+/DDp+, PD+/PDP+, QD+

Type	10+	20+	35+	50+	70+	100+	130+	170+	210+	320+	425+	550+
DD+	PDI +AD	PDI +AD	PDI +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD
DDp+	PDI +MD	PDI +MD	PDI +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD
PD+	PDI +AD	PDI +AD	PDI +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD
QD+	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD
PDp+	PDI +MD	PDI +MD	PDI +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD

UD+

Type	9+	15+	25+	45+	60+	100+	140+	180+	220+	310+	425+	550+
UD+	PDI +AD	PDI +AD	PDI +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD	PDG +AD

6 Technical data 20 bar filters

6.1 Reference conditions

Air inlet pressure	18 bar(e)	261 psig
Air inlet temperature	20°C	68 °F
Ambient temperature	20°C	68 °F

6.2 Principal data

Maximum compressed air inlet pressure	20 bar(e)	290 psig
Minimum compressed air inlet pressure	14 bar(e)	203 psig
Minimum compressed air inlet temperature	1°C	34°F
Maximum compressed air inlet temperature for QDh+	35°C	95°F
Minimum ambient temperature	1°C	34 °F
Maximum ambient temperature for QDh+	35°C	95 °F
Maximum ambient temperature for other types	65°C	149 °F
Maximum recommended pressure drop (not for QDh+)	0.35 bar(e)	5 psig

6.3 Specific data

DDh+/PDh+ filter

		DDh+			PDh+			
Challenge/inlet oil concentration	mg/m ³	3	10	40	0.1	3	10	40
Dry pressure drop filter element	mbar	60			75			
Wet pressure drop filter element	mbar	150	155	165	165	185	190	200
Dry pressure drop filter	mbar	85			100			
Wet pressure drop filter	mbar	170	180	190	190	210	215	225
Oil carry-over (aerosol)	mg/m ³	0.02	0.07	0.28	< 0.001	0.002	0.008	0.03
Total mass efficiency	%	99.3			99.92			
Remark		Typical installation (1)			Typical installation (1)			
Air purity class ISO 8573-1:2010		[2:-:3]			[1:-:2]			

(1) Typical installation: Compressor + refrigerant dryer/WSD + DDh+ + PDh+

QDh+ filter

		QDh+
Challenge/inlet oil concentration (aerosol)	mg/m ³	0.01
Dry pressure drop filter element	mbar	130
Wet pressure drop filter element	mbar	-
Dry pressure drop filter	mbar	140
Wet pressure drop filter	mbar	-
Oil carry-over (aerosol+vapor)	mg/m ³	0.003
Total mass efficiency	%	-
Efficiency (total count)	%	-
Remark		After DD+-PD+
Air purity class ISO 8573-1:2010		[-:-:1]

DDhp+/PDhp+ filter

			DDhp+	PDhp+
Initial pressure drop filter element	mbar		60	75
Initial pressure drop filter	mbar		85	100
Count efficiency	%	MPPS ^a	(MPPS ^a = 0.1 µm) 99.92	(MPPS ^a = 0.06 µm) 99.98
		1 µm	99.998	> 99.999
		0.01 µm	99.93	99.995
Remark			ISO-12500-3	ISO-12500-3
Air purity class ISO 8573-1:2010			[2:-:-]	[1:-:-] ^b


a) MPPS: Most Penetrating Particle Size

b) If preceded by a DDhp+

6.4 Rated flow at reference conditions

Type	15+	32+	55+	80+	110+	200+	270+	330+	490+
l/s	15	32	55	80	110	200	270	330	490
cfm	32	68	117	170	233	424	572	699	1038

6.5 Correction factors

	When the actual working pressure differs from the reference pressure, multiply the nominal capacity of the filter with the corresponding correction factor to obtain the correct capacity.
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Working pressure bar(e)	14	16	18	20
Working pressure psig	203	232	261	290
Correction factor	0.90	0.95	1	1.05

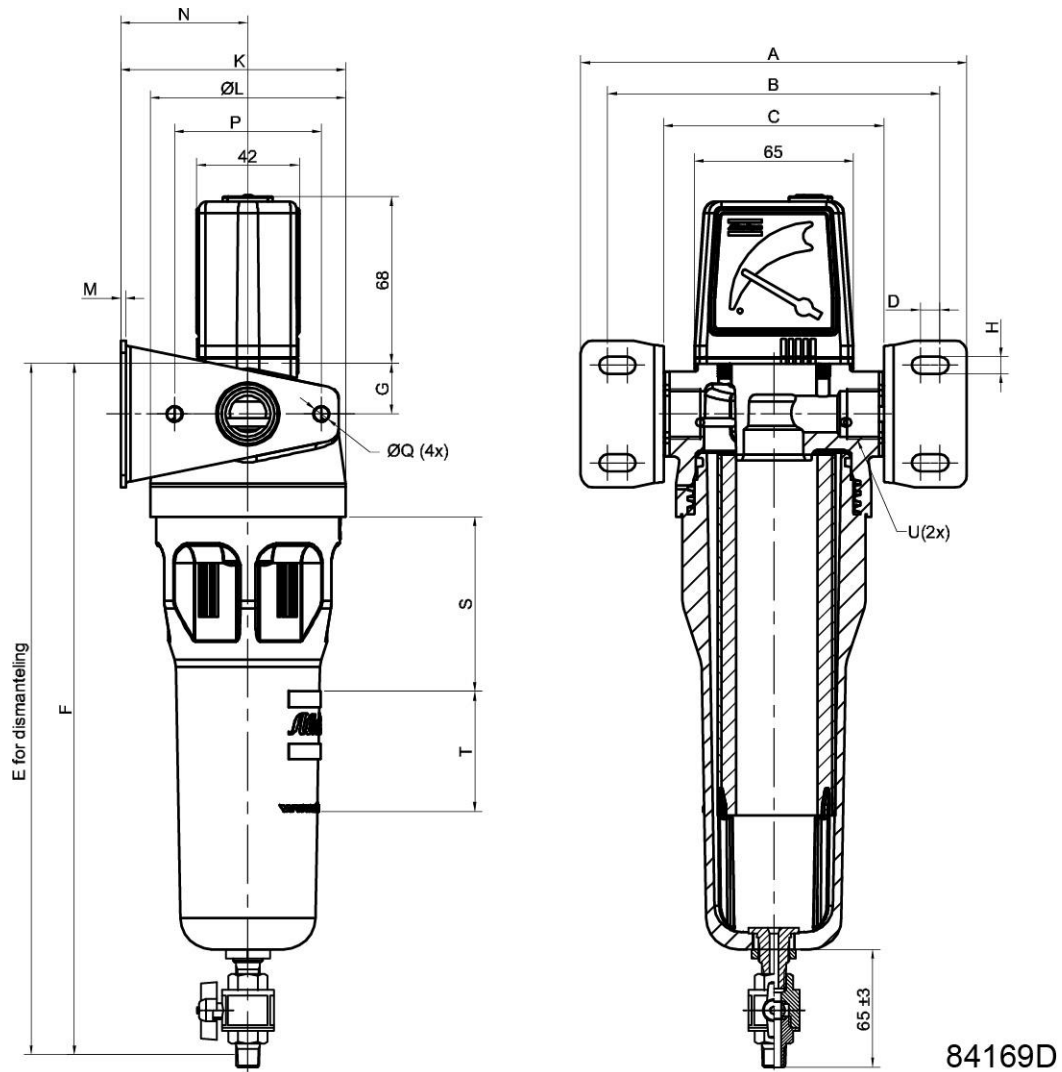
6.6 Dimensions and weight

Type	Net mass kg	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	J mm
15+	1	158	136	90	8	303	228	21	7	20
32+	1.1	158	136	90	8	303	228	21	7	20
55+	1.3	158	136	90	8	358	283	21	7	20
80+	1.9	190	168	110	5	378	303	27.5	10	30
110+	2.1	190	168	110	5	418	343	27.5	10	30
200+	4.2	240	218	140	5	549	449	34	10	42
270+	4.5	240	218	140	5	632	532	34	10	42
330+	4.6	240	218	140	5	632	532	34	10	42
490+	6.9	279	251	179	8	768	618	50	12	42

Type	K mm	L mm	M mm	N mm	P mm	Q mm	R mm	S mm	T mm	U "
15+	92	80	2	52	60	6.6	14	65	40	3/8
32+	92	80	2	52	60	6.6	14	65	52	1/2
55+	92	80	2	52	60	6.6	14	65	52	1/2
80+	118	100	2	68	76	9	15	70	56	3/4
110+	118	100	2	68	76	9	15	70	56	1
200+	157.5	131	2.5	92	103	9	20	98	78	1 1/2
270+	157.5	131	2.5	92	103	9	20	100	80	1 1/2
330+	157.5	131	2.5	92	103	9	20	100	80	1 1/2
490+	183	166	2.5	100	135	11	24	159	128	2

Dimension U is G (ISO 228/1) or NPT (ANSI B1.20.1) - thread.

Dimension E indicates the space needed for dismantling.



6.7 Supplied components

The table below gives an overview of the components provided on the different types of filters.

Abbreviations:

- PDG Pressure Differential Gauge
- MD ... Manual Drain

Type	15+	32+	55+	80+	110+	200+	270+	330+	490+
DDh+	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD
DDhp+	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD
PDh+	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD
QDh+	MD	MD	MD	MD	MD	MD	MD	MD	MD
PDhp+	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD	PDG +MD

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