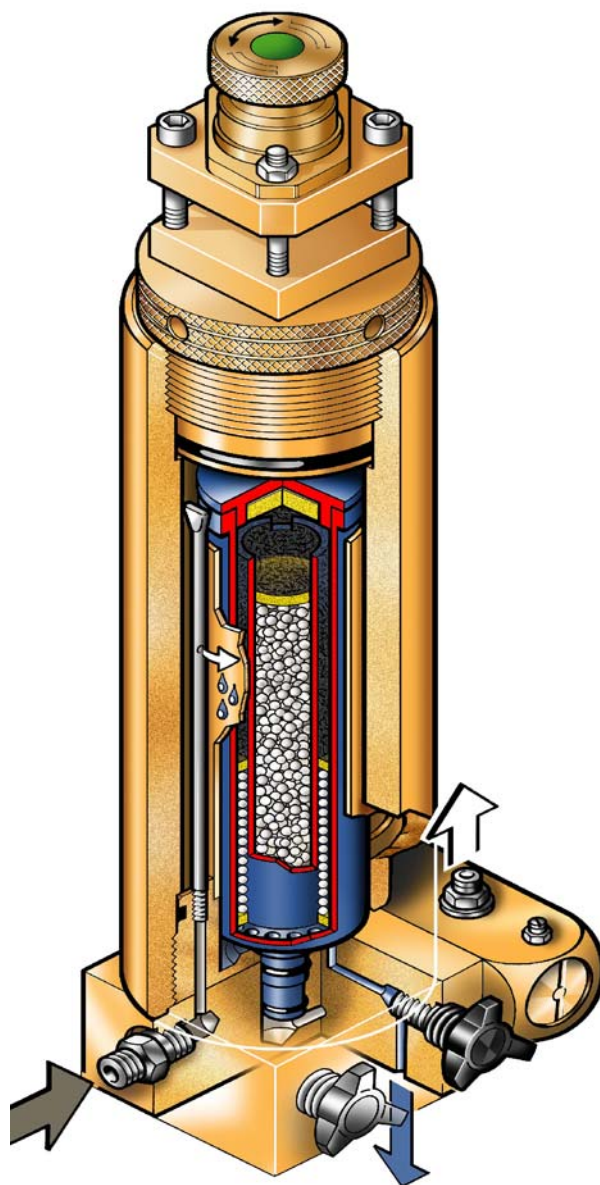


INSTRUCTION MANUAL AND SPARE PARTS CATALOGUE

BREATHING AIR PURIFICATION SYSTEM

P21 TRIPLEX[®]



Instruction Manual P21

INTRODUCTION

This manual contains operation and maintenance schedules for the high pressure breathing air purification system

P21

manufactured by Bauer Kompressoren GmbH, Munich.

All instructions should be observed and carried out in the order laid down to prevent damage and premature wear to the equipment and the units served by it.

While every effort is made to ensure the accuracy of the particulars contained in this manual, the manufacturing company will not, in any circumstances, be held liable for any inaccuracies or the consequences thereof.

Instruction Manual P21

TABLE OF CONTENTS

1.	GENERAL	1
2.	MAINTENANCE	4
3.	ANNEX	9

TABLE OF FIGURES

Fig. 1	Filter system P21	1
Fig. 2	Venting bore	2
Fig. 3	Change-over device	2
Fig. 4	Pressure maintaining valve	3
Fig. 5	Venting the final pressure safety bore	5
Fig. 6	Processing capacity filter cartridge 057679	6
Fig. 7	Processing capacity filter cartridge 057679	6
Fig. 8	Processing capacity filter cartridge 059183	7
Fig. 9	Processing capacity filter cartridge 059183	7

ANNEX

Applicable parts list:	B5
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Change notice

Change no.	Change date
0	June 1980, basic edition
1	August 1990
2	January 1994
3	July 1998
4	August 1998

Instruction Manual P21

1. GENERAL

FUNCTIONAL DESCRIPTION

Air leaving final stage is cooled in the after-cooler to approx. 10 - 15 °C (18 - 27 °F) above ambient temperature and then enters filter system P21 with **TRIPLEX**® longlife cartridge (Fig. 1). The filter assembly consists of separator and cartridge chamber. In the separator surrounding the cartridge chamber liquid oil and water particles are reliably separated from the compressed medium by a pipe nozzle.

Residual oil vapours are then removed by the activated charcoal cartridge, oil and water vapours by the **TRIPLEX**® longlife cartridge. The air leaving the filter assembly is then free of oil, taste and smell.

- 1 Filter inlet
- 2 Jet pipe
- 3 Filter head
- 4 Final pressure safety valve
- 5 Housing
- 6 Chamber separator
- 7 Cartridge
- 8 Filter outlet
- 9 Pressure maintaining valve
- 10 Condensate drain tap
- 11 Condensate outlet

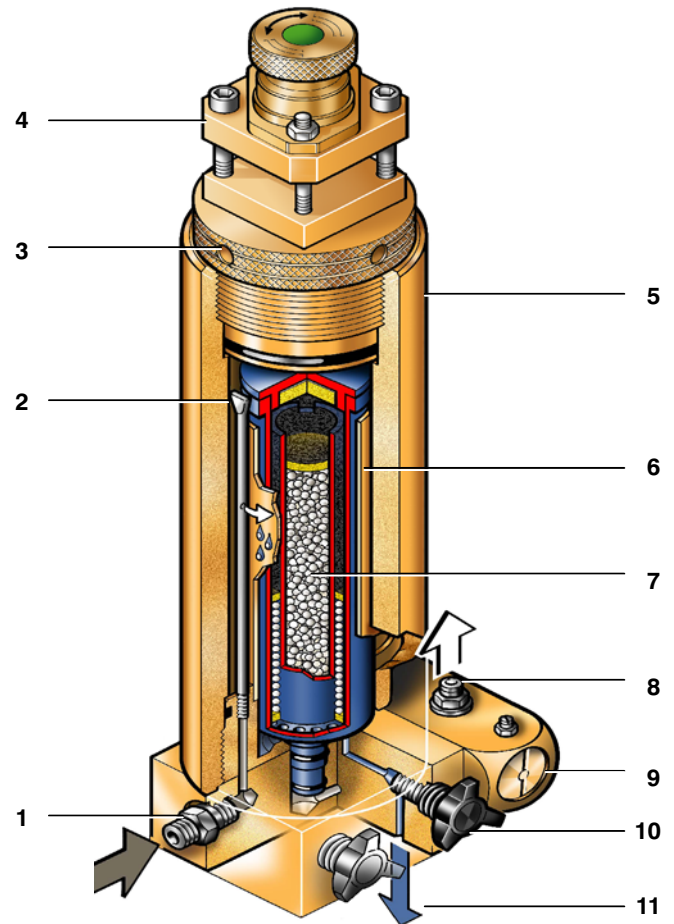


Fig. 1 Filter system P21

CARTRIDGE SAFETY BORE

The filter system P 21 is designed to prevent pressurizing in the absence of the filter cartridge. A bore provided in the filter bottom is sealed air-tight only if the cartridge is in place (Fig. 2).



No pressure build up without cartridge!

Without cartridge the venting bore is not sealed, the air escapes into the atmosphere, no pressure can be built up and thus it is ensured, that unfiltered air is not supplied to the consuming device. The venting bore is also used to check the O-rings on the cartridge pin. If air is leaking out of the venting bore even though a cartridge is installed, the O-rings are either broken or were damaged on installation. Remove and check cartridge. If necessary replace cartridge or O-rings.

LIFETIME**WARNING**

The oil and water separator is subject to dynamic load. It is designed to withstand a certain no. of load cycles.

(1 load cycle = 1 pressurization, 1 depressurization) at the specified pressure range. The oil and water separator must be replaced when the maximum permissible no. of load cycles has been reached. Refer to the pressure vessel operating manual delivered with the unit.

The maximum recommended amount of four load cycles per hour should not be exceeded. If it is possible to regulate the operation of the unit to such a degree as to achieve four load cycles per hour, in our opinion this would be an optimum between usage and actual life.

To avoid exceeding the max. number of load cycles the operating hours should be recorded in the table in annex of this instruction manual.

CHANGE-OVER DEVICE PN 300/PN 200 (OPTION)

(Fig. 3) This device allows bottle filling to 200 bar (3,200 psig) with a 300 bar (4,700 psig) rated unit. Safety valve - B and filling device PN 200 bar are connected by opening change-over valve - A and the connected bottles can be filled with a 200 bar pressure, as described in the corresponding instruction manual.

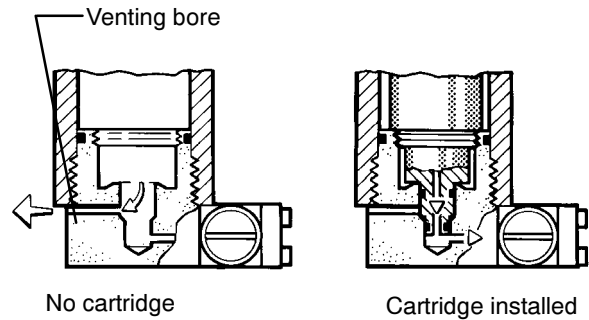


Fig. 2 Venting bore

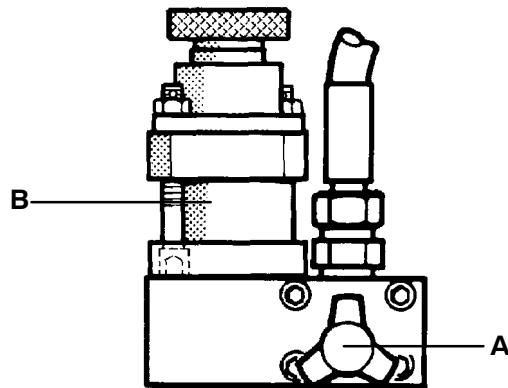


Fig. 3 Change-over device

Instruction Manual P21

PRESSURE MAINTAINING VALVE

DESCRIPTION

A pressure maintaining valve is mounted at the outlet of the filter. This valve ensures a constant minimum pressure within the filter assembly right from the start of the compressor unit thus achieving optimum filtering action.

The pressure maintaining valve ensures that pressure is built up in the filters even from the start of delivery, thus achieving a constant, optimum filtration. It will also guarantee proper working conditions for the final stage cylinder.

The pressure maintaining valve is adjusted to **150 ±10 bar (2,175 psi)**.

It prevents already filtered air from flowing back from the downstream filters when draining condensate from the oil and water separator.

MAINTENANCE

The pressure maintaining valve (Fig. 4) is adjusted at the factory to the required pressure and normally does not require regular maintenance or readjustment. In case of readjustment becoming necessary, loosen jam nut (2) and set screw (3). Adjust screw (1) to the required pressure using a suitable screwdriver.

Clockwise = increase pressure

Counter-clockwise = decrease pressure

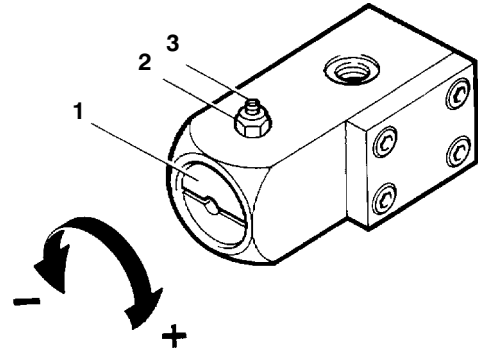


Fig. 4 Pressure maintaining valve

2. MAINTENANCE

General instructions for filter maintenance

- **Depressurize** system before starting any maintenance work.
- **Dry** inside of filter housing before installing new cartridge with a clean cloth and check for corrosion.
- **Lubricate** threads and O-rings as well as threaded part of cartridge with white petrolatum DAB 9 order no. N 19091 or WEICON WP 300 white order no. N 19752.
- **Observe** number of operating hours as indicated on hour meter to ensure exact attention to the maintenance intervals.
- **Change** cartridge before reactivating a compressor unit after out-of-service periods of more than 3 months.
- **Leave** cartridge in the filter as long as unit is out of service.
- **Keep** all condensate drain valves and shut-off valves closed. Keep a minimum pressure of approx. 50 to 80 bar (700 to 1,100 psi) within the system to prevent moisture entering the compressor piping and filter system.
- **The nozzle type oil and water separator is maintenance-free.**

Filter cartridges

New filter cartridges are vacuum-packed and can be stored for two years (refer to date on the cartridge). A defective vacuum package cannot protect the cartridge appropriately against environmental influences during storage. Should the package be damaged, do not use the cartridge.

To avoid any danger to your health or damage to your unit, change used up cartridges in good time.

Never fill used up cartridges yourself! The filter material was chosen specifically by **BAUER-KOMPRESSOREN** for each kind of application.

Pay attention to cleanliness and hygiene when changing the filter.

Filter service lifetime

The average weight (without package) of a new cartridge and the increase in weight can be checked with appropriate weighing scales. Due to inevitable production tolerances, there may be small differences compared to the given data.

The number of operating hours or the amount of possible bottle fillings per filter cartridge can be determined by the tables in Fig. 6 to Fig. 9 taking into consideration the ambient temperature and the cartridge used.

These tables contain calculated cartridge lifetime data, that refer to defined and constant operating conditions. Tolerances at bottle fillings and different operating temperatures can lead to considerable divergences compared to data given, which therefore can only serve as reference values for the user.

Cartridge 057679 is the normal TRIPLEX-cartridge for electric units.

Filling weight: 191 g; Saturation weight 205 g.

Example: at an ambient temperature of 20°C, 36 to 45 10-ltr-bottles can be filled with a TRIPLEX-cartridge, which is equivalent to 12 to 15 compressor operating hours at a filling pressure of 200 bar.

On compressor units with petrol engines only use **cartridge, part no. 059183 to dry, de-oil and remove CO.**

Filling weight: 217 g; Saturation weight 229 g.

Example: at an ambient temperature of 20°C, 31 to 38 10-ltr-bottles can be filled with this cartridge, which is equivalent to between 10 and 13 operating hours at a filling pressure of 200 bar.



The longer service life of the cartridge at a filling pressure of 300 bar is annihilated by the larger volume of filled air per bottle, therefore the possible number of bottle fillings stays the same at different pressures.

Cartridge change



For safety reasons only CO removal cartridges part no. 059183 should be used on compressor units with petrol engine. On units with electric engine either CO removal cartridge part no. 059183 or TRIPLEX cartridge part no. 057679 can be used.



Units with petrol engine are delivered with CO removal cartridge part no. 059183 as standard, units with electric engine with TRIPLEX cartridge part no. 057679. When changing from electric engine to a petrol engine also replace cartridge part no. 057679 with cartridge part no. 059183.



Never remove replacement cartridge from packaging prior to actual use otherwise highly sensitive molecular sieve will absorb water vapour from surrounding air and cartridge saturated and thus be ruined.

- Depressurize filter system by opening condensate drain valves.
- Unscrew screw joint (3, Fig. 1) on top of the filter.
- Extract old cartridge and insert a new one.



The used cartridge must be disposed of according to local regulations.

Instruction Manual P21

Checking the final pressure safety valve

The final pressure safety valve is mounted on top of the oil and water separator. For testing of the function it is fitted with a knurled knob. To test the safety valve, turn the knob clockwise until the safety valve relieves pressure

Condensate drainage

a. Manually:

Drain condensate from separator and cartridge chamber regularly by slowly opening drain valves

- before each filling procedure
- during filling procedure every 30 minutes at high humidity every 15 minutes.

b. Automatically:

For units with automatic condensate drain refer to section 10 of the instruction manual.

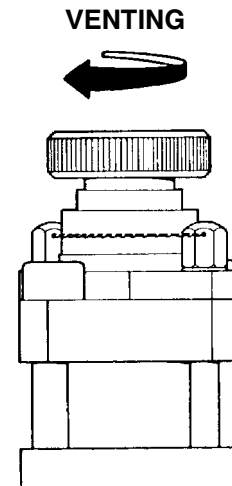


Fig. 5 Venting the final pressure safety bore

Air and Gas Processing

Life time of filter cartridge

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filter cartridge **057679** mass of molecular sieve mMS [gr] = 68

ambient temperature t U [°C]	temperature of final separator t Ab [°C]	moisture content of air, 100 % saturated X [gr/m³]	volume of processed air Va [m³] at pressure p [bar]		number of bottle fillings n and bottle size		
			200	300	7 ltr.	10 ltr.	12 ltr.
10	20 - 24	17,31 - 21,80	157 - 125	236 - 187	112 - 89	79 - 62	65 - 52
15	25 - 29	23,07 - 28,79	118 - 94	177 - 142	84 - 67	59 - 47	49 - 39
20	30 - 34	30,4 - 37,63	89 - 72	134 - 108	64 - 52	45 - 36	37 - 30
25	35 - 39	39,65 - 48,64	69 - 56	103 - 84	49 - 40	34 - 28	29 - 23
30	40 - 44	51,21 - 62,41	53 - 44	80 - 65	38 - 31	27 - 22	22 - 18
35	45 - 49	65,52 - 79,28	42 - 34	62 - 51	30 - 25	21 - 17	17 - 14
40	50 - 54	83,08 - 99,85	33 - 27	49 - 41	23 - 19	16 - 14	14 - 11

bottle filling volume VF [m³]		
bottle size l [ltr]	at pressure p [bar]	
	200	300
7	1,4	2,1
10	2	3
12	2,4	3,6

number of bottle fillings = processed volume of air / bottle filling volume = Va / VF

bottle filling volume:
VF [m³] = p [bar] x l [ltr] / 1000 [ltr/m³]

volume of air which can be processed:
Va [m³] = 0,2 x mMS [gr] / (X [gr/m³] / p [bar]) = 0,2 x p [bar] x mMS [gr] / X [gr/m³]

life time of filter cartridge:
tp [h] = Va [m³] / (Q [m³/min] x 60 [min/h])

Fig. 6 Processing capacity filter cartridge 057679 according to bottle fillings

Air and Gas Processing

Life time of filter cartridge

BAUER KOMPRESSOREN GmbH

filter cartridge: **057679**

filling pressure p = 200 bar:

ambient temperature t U [°C]		temperature of final separator t Ab [°C]		life time of filter cartridge in hours			
				Junior Utilus	Capitano	Mariner	
						Diesel	elektric engine
flow capacity Q [ltr/min]							
		100	140	170	190		
10	20 - 24	26 - 21	19 - 15	15 - 12	14 - 11	8	
15	25 - 29	20 - 16	14 - 11	12 - 9	10 - 8	8	
20	30 - 34	15 - 12	11 - 9	9 - 7	8 - 6	6	
25	35 - 39	11 - 9	8 - 7	7 - 5	6 - 5	5	
30	40 - 44	9 - 7	6 - 5	5 - 4	5 - 4	4	
35	45 - 49	7 - 6	5 - 4	4 - 3	4 - 3	3	
40	50 - 54	5 - 5	4 - 3	3 - 3	3 - 2	2	

filling pressure p = 300 bar:

ambient temperature t U [°C]		temperature of final separator t Ab [°C]		life time of filter cartridge in hours			
				Junior Utilus	Capitano	Mariner	
						Diesel	elektric engine
flow capacity Q [ltr/min]							
		100	140	170	190		
10	20 - 24	39 - 31	28 - 22	23 - 18	21 - 16	16	
15	25 - 29	29 - 24	21 - 17	17 - 14	16 - 12	12	
20	30 - 34	22 - 18	16 - 13	13 - 11	12 - 10	10	
25	35 - 39	17 - 14	12 - 10	10 - 8	9 - 7	7	
30	40 - 44	13 - 11	9 - 8	8 - 6	7 - 6	6	
35	45 - 49	10 - 9	7 - 6	6 - 5	5 - 5	5	
40	50 - 54	8 - 7	6 - 5	5 - 4	4 - 4	4	

Fig. 7 Processing capacity filter cartridge 057679 according to operating hours

Instruction Manual P21

Air and Gas Processing

Life time of filter cartridge

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filter cartridge **059183** mass of molecular sieve mMS [gr] = 58

ambient temperature t U [°C]	temperature of final separator t Ab [°C]	moisture content of air, 100 % saturated X [gr/m³]	volume of processed air Va [m³] at pressure p [bar]				number of bottle fillings n and bottle size		
			200		300		7 ltr.	10 ltr.	12 ltr.
10	20 - 24	17,31 - 21,80	134 - 106	201 - 160	96 - 76	67 - 53	56 - 44		
15	25 - 29	23,07 - 28,79	101 - 81	151 - 121	72 - 58	50 - 40	42 - 34		
20	30 - 34	30,4 - 37,63	76 - 62	114 - 92	55 - 44	38 - 31	32 - 26		
25	35 - 39	39,65 - 48,64	59 - 48	88 - 72	42 - 34	29 - 24	24 - 20		
30	40 - 44	51,21 - 62,41	45 - 37	68 - 56	32 - 27	23 - 19	19 - 15		
35	45 - 49	65,52 - 79,28	35 - 29	53 - 44	25 - 21	18 - 15	15 - 12		
40	50 - 54	83,08 - 99,85	28 - 23	42 - 35	20 - 17	14 - 12	12 - 10		

bottle filling volume VF [m³]		
bottle size	at pressure p [bar]	
l [ltr]	200	300
7	1,4	2,1
10	2	3
12	2,4	3,6

number of bottle fillings = processed volume of air / bottle filling volume = Va / VF

bottle filling volume:
VF [m³] = p [bar] x l [ltr] / 1000 [ltr/m³]

volume of air which can be processed:
Va [m³] = 0,2 x mMS [gr] / (X [gr/m³] / p [bar]) = 0,2 x p [bar] x mMS [gr] / X [gr/m³]

life time of filter cartridge:
tp [h] = Va [m³] / (Q [m³/min] x 60 [min/h])

Fig. 8 Processing capacity filter cartridge 059183 according to bottle fillings

Air and Gas Processing

Life time of filter cartridge

BAUER KOMPRESSOREN GmbH

filter cartridge: **059183**

filling pressure p = 200 bar:

ambient temperature t U [°C]		temperature of final separator t Ab [°C]		life time of filter cartridge in hours							
				Junior Utilus		Capitano		Mariner			
								Diesel		elektric engine	
				flow capacity Q [ltr/min]							
				100	140	170	190				
10	20 - 24	22 - 18	16 - 13	13 - 10	12 - 8	10 - 8	9 - 7	9 - 7	7 - 5		
15	25 - 29	17 - 13	12 - 10	10 - 8	7 - 6	6 - 5	5 - 4	4 - 3	3 - 3		
20	30 - 34	13 - 10	9 - 7	7 - 6	6 - 4	4 - 3	3 - 3	3 - 3	3 - 3		
25	35 - 39	10 - 8	7 - 6	6 - 5	5 - 4	4 - 3	3 - 3	3 - 3	3 - 3		
30	40 - 44	8 - 6	5 - 4	4 - 3	3 - 3	3 - 2	2 - 2	2 - 2	2 - 2		
35	45 - 49	6 - 5	4 - 3	3 - 3	3 - 2	2 - 2	2 - 2	2 - 2	2 - 2		
40	50 - 54	5 - 4	3 - 3	3 - 2	2 - 2	2 - 2	2 - 2	2 - 2	2 - 2		

filling pressure p = 300 bar:

ambient temperature t U [°C]		temperature of final separator t Ab [°C]		life time of filter cartridge in hours							
				Junior Utilus		Capitano		Mariner			
								Diesel		elektric engine	
				flow capacity Q [ltr/min]							
				100	140	170	190				
10	20 - 24	34 - 27	24 - 19	20 - 16	18 - 14	15 - 12	13 - 11	13 - 11	10 - 8		
15	25 - 29	25 - 20	18 - 14	15 - 12	11 - 9	9 - 7	8 - 6	6 - 5	5 - 4		
20	30 - 34	19 - 15	14 - 11	11 - 9	9 - 7	7 - 5	6 - 5	5 - 4	4 - 3		
25	35 - 39	15 - 12	10 - 9	9 - 7	7 - 5	5 - 4	4 - 3	4 - 3	4 - 3		
30	40 - 44	11 - 9	8 - 7	7 - 5	5 - 4	4 - 3	4 - 3	4 - 3	4 - 3		
35	45 - 49	9 - 7	6 - 5	5 - 4	4 - 3	4 - 3	4 - 3	4 - 3	4 - 3		
40	50 - 54	7 - 6	5 - 4	4 - 3	4 - 3	4 - 3	4 - 3	4 - 3	4 - 3		

Fig. 9 Processing capacity filter cartridge 059183 according to operating hours

3. ANNEX

- **Operating hours record**
Technical informations
Drawings
Parts Lists

For connecting automatic condensate drain to TRIPLEX filter system KB 062211, use standard automatic condensate drain KB 068222.



Technical Info

To connect an automatic condensate drain unit to the TRIPLEX filter KB 062211, remove the two connections no. N 16334.
Also, remove the two drain taps KB 065500 and replace these parts with two adapters KB 63666.

