

Operating instructions



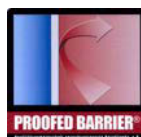
Automatic fuel oil de-aerator

Flow-Control

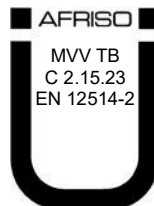


Type: Flow-Control 3/K
Type: Flow-Control 3/K (G $\frac{1}{4}$)
Type: Flow-Control 3/K HT

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in conjunction with a
PA hose 4 x 1 mm



Lindenstraße 20
74363 Güglingen
Telephone +49 7135 102-0
Service +49 7135 102-211
Telefax +49 7135 102-147
info@afriso.com
www.afriso.com

1 About these operating instructions

These operating instructions describe the automatic fuel oil de-aerator "Flow-Control" (also referred to as "product" in these operating instructions). These operating instructions are part of the product.

- You may only use the product if you have fully read and understood these operating instructions.
- Verify that these operating instructions are always accessible for any type of work performed on or with the product.
- Pass these operating instructions as well as all other product-related documents on to all owners of the product.
- If you feel that these operating instructions contain errors, inconsistencies, ambiguities or other issues, contact the manufacturer prior to using the product.

These operating instructions are protected by copyright and may only be used as provided for by the corresponding copyright legislation. We reserve the right to modifications.

The manufacturer shall not be liable in any form whatsoever for direct or consequential damage resulting from failure to observe these operating instructions or from failure to comply with directives, regulations and standards and any other statutory requirements applicable at the installation site of the product.

2 Information on safety

2.1 Safety messages and hazard categories

These operating instructions contain safety messages to alert you to potential hazards and risks. In addition to the instructions provided in these operating instructions, you must comply with all directives, standards and safety regulations applicable at the installation site of the product. Verify that you are familiar with all directives, standards and safety regulations and ensure compliance with them prior to using the product.

Safety messages in these operating instructions are highlighted with warning symbols and warning words. Depending on the severity of a hazard, the safety messages are classified according to different hazard categories.

NOTICE

NOTICE indicates a hazardous situation, which, if not avoided, can result in equipment damage.

2.2 Intended use

This product may only be used in single-line systems with return pipe connection for continuous de-aeration of the following liquids in fuel oil consuming systems:

- Fuel oil EL as per DIN 51603-1 and as per DIN SPEC 51603-6 with 0 - 30 % fatty acid methyl ester (FAME) as per EN 14214
- Diesel fuel as per EN 590 with up to 7 % fatty acid methyl ester (FAME) as per EN 14214
- Biofuel and biodiesel with up to 30 % fatty acid methyl ester (FAME) as per EN 14214
- Paraffinic fuels (for example HVO/GTL) proportionally with 0 - 100 % (product Flow-Control 3/K HT only)

The product Flow-Control 3/K HT is suitable for applications with vegetable oil or liquids with higher temperatures.

Any use other than the application explicitly permitted in these operating instructions is not permitted and causes hazards.

Verify that the product is suitable for the application planned by you prior to using the product. In doing so, take into account at least the following:

- All directives, standards and safety regulations applicable at the installation site of the product
- All conditions and data specified for the product
- The conditions of the planned application

In addition, perform a risk assessment in view of the planned application, according to an approved risk assessment method, and implement the appropriate safety measures, based on the results of the risk assessment. Take into account the consequences of installing or integrating the product into a system or a plant.

When using the product, perform all work and all other activities in conjunction with the product in compliance with the conditions specified in the operating instructions and on the nameplate, as well as with all directives, standards and safety regulations applicable at the installation site of the product.

2.3 Predictable incorrect application

The product must never be used in the following cases and for the following purposes:

- Use with undiluted additives, alcohols and acids
- Use in pressure supply systems without appropriate protection precautions
- Outdoor use (exception: with suitable weather protection)

2.4 Qualification of personnel

This product may only be mounted, commissioned, maintained and decommissioned by a qualified, specialised company which has all required certifications and which meets the following requirements:

- Compliance with all directives, standards and safety regulations concerning handling of water-polluting substances as applicable at the installation site of the product.
- In Germany: Certification as per § 62 "Verordnung über Anlagen zum Umgang mit wassergefährdenden Stoffen" (AwSV) (Ordinance on Installations for Handling Water-Polluting Substances).

Only appropriately trained persons who are familiar with and understand the contents of these operating instructions and all other pertinent product documentation are authorized to work on and with this product.

Transport and storage

These persons must have sufficient technical training, knowledge and experience and be able to foresee and detect potential hazards that may be caused by using the product.

All persons working on and with the product must be fully familiar with all directives, standards and safety regulations that must be observed for performing such work.

2.5 Personal protective equipment

Always wear the required personal protective equipment. When performing work on and with the product, take into account that hazards may be present at the installation site which do not directly result from the product itself.

2.6 Modifications to the product

Only perform work on and with the product which is explicitly described in these operating instructions. Do not make any modifications to the product which are not described in these operating instructions.

3 Transport and storage

The product may be damaged as a result of improper transport or storage.

NOTICE

INCORRECT HANDLING

- Verify compliance with the specified ambient conditions during transport or storage of the product.
- Use the original packaging when transporting the product.
- Store the product in a clean and dry environment.
- Verify that the product is protected against shocks and impact during transport and storage.

Failure to follow these instructions can result in equipment damage.

4 Product description

4.1 Versions

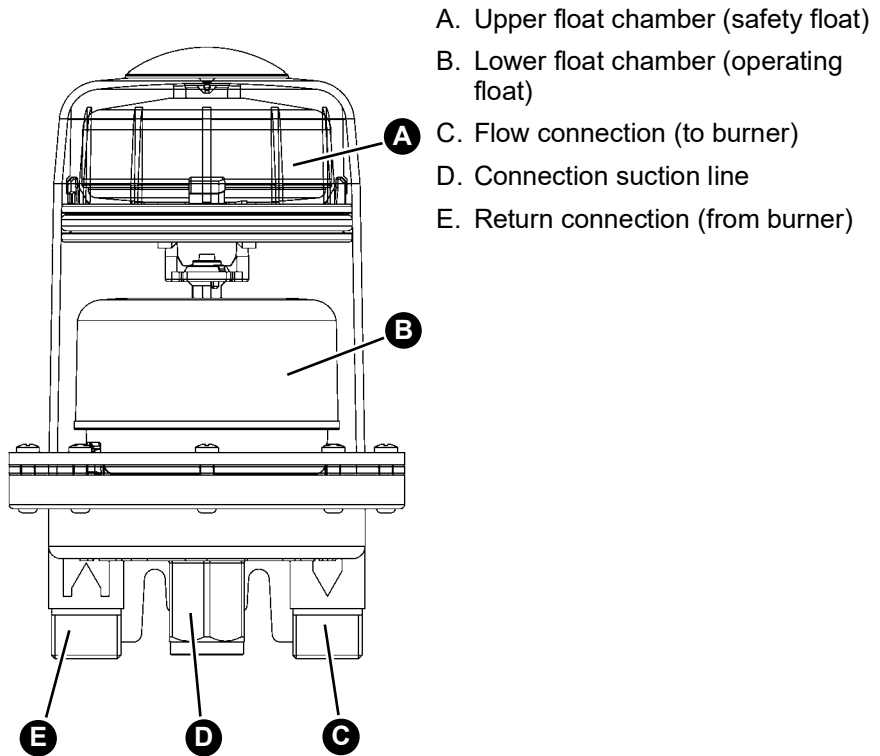


Fig. 1: Flow-Control 3/K (left) / Flow-Control 3/K HT (right)

Flow-Control 3/M consists of a die-cast zinc housing with a transparent float chamber.

Flow-Control 3/K HT consists of a die-cast zinc housing and a non-transparent float chamber as well as FKM seals.

4.2 Overview



4.3 Function

The burner pump draws the liquid fuel from the tank via the check valve installed in the product. The fuel not burnt by the burner nozzle is returned to the vent via the return line and then resupplied to the burner via the flow line. Only the amount of fuel actually burnt is taken from the tank and added to the de-aerated fuel.

The upper float chamber keeps foam from escaping through the vent opening.

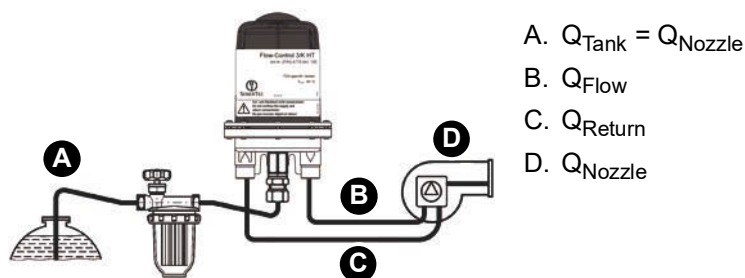


Fig. 2: Example Flow-Control 3/K HT

4.4 Approvals, conformities, certifications

The product is TÜV-tested (report no. 968/FSP 2170.01/21).

4.5 Technical data

Parameter	Value
General specifications	
Dimensions (W x H x D)	95 x 147 x 95 mm
Connection burner	2 x G ³ / ₈ male with 60° cone for burner hose or 2 x G ¹ / ₄ female
Connection tank	G ¹ / ₄ female
Nozzle throughput	Max. 100 l/h
Return flow	Max. 120 l/h
Separating capacity air/gas, depending on air content of fuel	Max. 4 l/h (de-aeration unit only) Max. 6 l/h (as per EN 12514-3)
Mounting position	Float housing vertical to the top
Operating overpressure	Max. 0.7 bar (corresponds to a static liquid column of approximately 8 m)
Suction pressure	Max. -0.5 bar
Test pressure	6 bar
Seals	
- Type: 3/K	NBR
- Type: 3/K HT	FKM
Ambient conditions	
Ambient temperature operation	5 ... 60 °C
Temperature of the medium	
- Type: 3/K	5 ... 60 °C
- Type: 3/K HT	5 ... 80 °C

5 Mounting

Install the product upstream of the burner.

The product may be installed above or below the maximum tank level.

5.1 Determining the cross section of the suction line

When dual-pipe systems are converted to single-pipe operation, the flow rate of the fuel in the suction line is reduced.

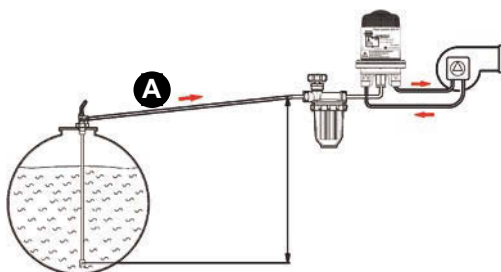
- ⇒ Verify that the cross section of the suction line complies with DIN 4755-2 (flow rate 0.2 to 0.5 m/s) in order to help avoid air cushions in higher pipe sections and pipes with gradients (shutdowns due to error conditions).

Consider the specifications and instructions of the system manufacturer.

5.2 Determining the suction line length

With the maximum possible suction line length, the maximum suction vacuum must not exceed -0.4 bar.

5.2.1 Maximum suction line length in the case of rising line

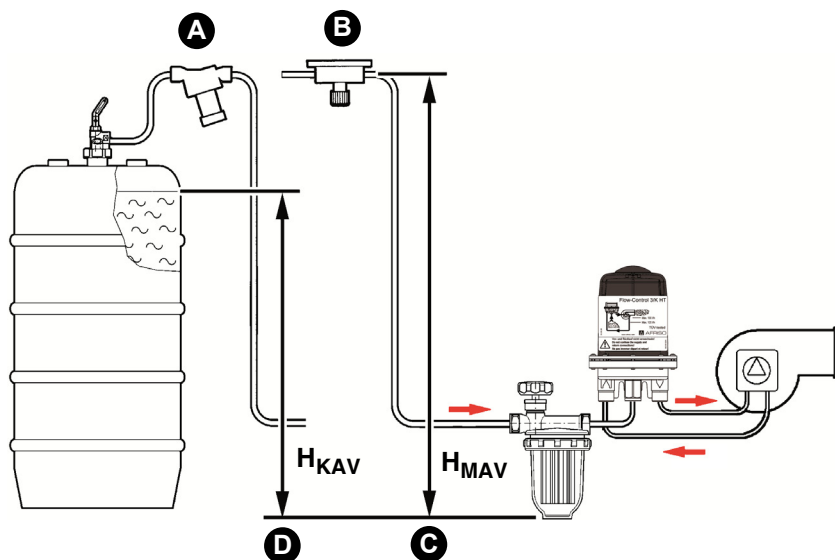


1. Remove all check valves at the tank and in the area of a self-securing suction line (A).

Nozzle capacity	Inner pipe Ø	Suction height H [m]						
		1.5	2.0	2.5	3.0	3.5	4.0	
< 2.5 kg/h (3 l/h)	Ø 4 mm	32	26	19	13	7	1	Maximum possible suction line length [m]
	Ø 6 mm	> 100	> 100	> 100	68	36	4	
	Ø 8 mm	> 100	> 100	> 100	> 100	> 100	14	
5 kg/h (6 l/h)	Ø 4 mm	10	8	6	4	2	1	
	Ø 6 mm	81	65	49	34	18	2	
	Ø 8 mm	> 100	> 100	> 100	> 100	57	7	
7.5 kg/h (9 l/h)	Ø 4 mm	10	8	6	4	2	0	
	Ø 6 mm	54	43	33	22	12	1	
	Ø 8 mm	> 100	> 100	> 100	71	38	4	
10 kg/h (12 l/h)	Ø 4 mm	8	6	4	3	1	0	
	Ø 6 mm	40	32	25	17	9	1	
	Ø 8 mm	> 100	> 100	78	53	28	3	
	Ø 10 mm	> 100	> 100	> 100	> 100	69	8	
15 kg/h (18 l/h)	Ø 6 mm	27	21	16	11	6	0	
	Ø 8 mm	86	69	52	35	19	2	
	Ø 10 mm	> 100	> 100	> 100	87	46	5	
20 kg/h (24 l/h)	Ø 6 mm	20	16	12	8	4	0	
	Ø 8 mm	64	52	39	26	14	1	
	Ø 10 mm	> 100	> 100	96	65	35	4	

5.2.2 Maximum suction line length in the case of a lower lying line

1. Install an anti-siphon valve to keep liquid fuel from escaping (siphoning) in the case of an untight suction line and a higher level in the tank.



A. Piston type anti-siphon valve "KAV"

B. Diaphragm type anti-siphon valve "MAV"

C. H_{MAV} = Safe height "MAV"

D. H_{KAV} = Safe height "KAV"

Mounting

Nozzle throughput	Inner pipe Ø	Suction height H [m]						
		1.5	2.0	2.5	3.0	3.5	4.0	
< 2.5 kg/h (3 l/h)	Ø 4 mm	32	26	19	13	7	1	Maximum possible suction line length [m]
5 kg/h (6 l/h)	Ø 4 mm	10	8	6	4	2	1	
7.5 kg/h (9 l/h)	Ø 4 mm	10	8	6	4	2	0	
	Ø 6 mm	54	43	33	22	12	1	
10 kg/h (12 l/h)	Ø 4 mm	8	6	4	3	1	0	
	Ø 6 mm	40	32	25	17	9	1	
15 kg/h (18 l/h)	Ø 6 mm	27	21	16	11	6	0	
20 kg/h (24 l/h)	Ø 6 mm	20	16	12	8	4	0	
	Ø 8 mm	64	52	39	26	14	1	

5.3 Mounting the product

NOTICE

LEAKING PRODUCT

- Verify that you use a screwed pipe connection as per DIN 2353 with cylindrical thread (G thread) and seal the screwed pipe connection with a flat gasket or with suitable glue. Do not use Teflon tape or hemp.

Failure to follow these instructions can result in equipment damage.

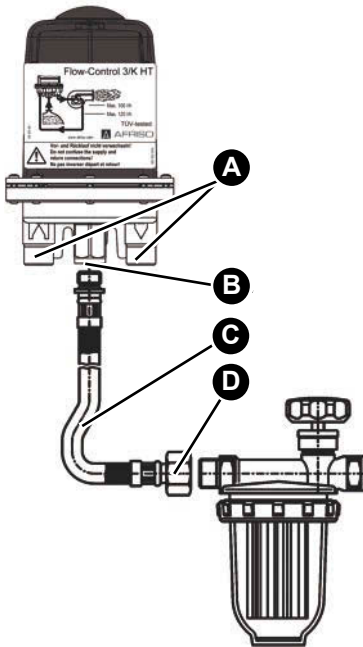
NOTICE

INOPERABLE PRODUCT

- Verify that you do not interchange the burner hoses for the flow and return lines.

Failure to follow these instructions can result in equipment damage.

- ⇒ Verify compliance with the specified ambient conditions.
- ⇒ Verify that the float housing points vertically to the top.
- ⇒ Verify that an oil filter is installed in the supply line upstream of the product.



1. Mount the product using the enclosed screws.
2. Use the bracket as a template when drilling the holes ($\varnothing$ 3 mm).
3. Mount the burner hoses at the flow and the return (A). The tightening torque is 20 ± 5 Nm.

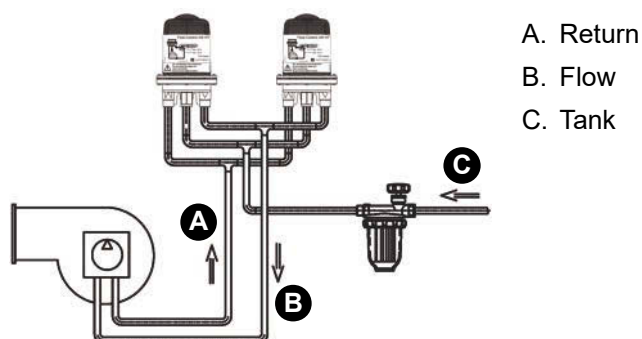
4. Use a use cylindrical pipe connection $G^{1/4}$ as per DIN 2353 if the burner hoses are not connected directly (for example, housing version with flow and return connection $G^{1/4}$ female). The tightening torque is 40 ± 5 Nm.

5.4 Pressure test

⇒ Verify that the product is not included in the pressure test.

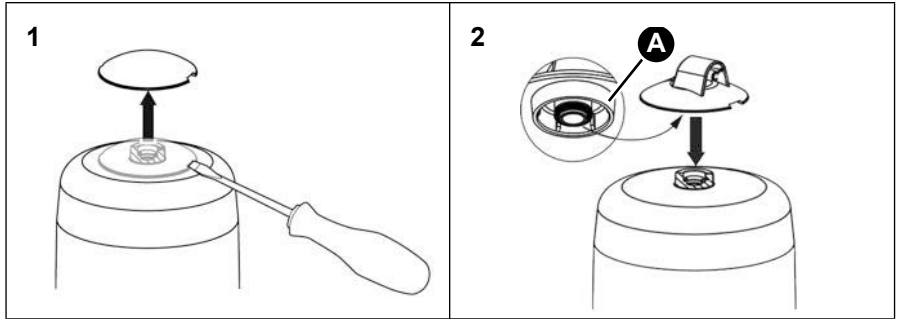
5.5 Parallel connection

If, for example, the nozzle throughput is between 100 and 200 l/h in the case of larger burners or if the return flow is 120 l/h to a maximum of 240 l/h, two products can be connected in parallel.

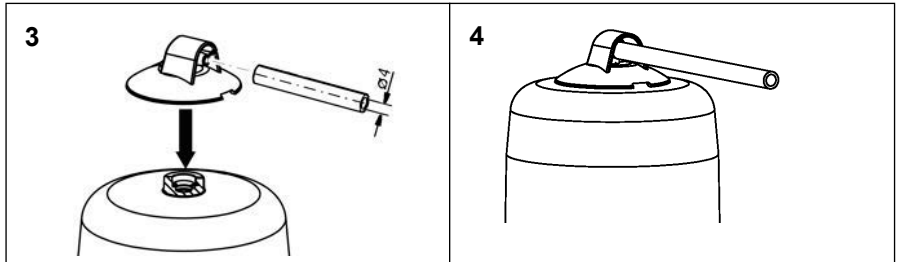


5.6 Connecting the vent hose

To avoid odours from the separated air, you can connect a vent hose.



A. Hose connection with O ring



1. Route the vent hose back to the tank next to the suction line.
2. Fixate the vent hose with cable ties.
3. Mount the other end of the vent hose to, for example, the de-aeration of the tank or the return connection of the withdrawal fitting.

6 Operation

6.1 Pressure mode

Tanks mounted up to 4 m higher do not affect the function of the product. Use protection equipment against siphoning (anti-siphon valve) in the suction line.

If a de-aerator is required in a pressure system, suitable safety-related equipment must be installed so the the maximum permissible inlet pressure of 0.7 bar cannot be exceeded.

Use Flow-Control 3/K HT with an upstream filter and a brass filter cup as a de-aerator.

6.2 Liquid level in the float housing

The liquid level depends on the operating conditions of the system and amounts to approximately 20-50 mm in suction mode. If the liquid level is higher, the float housing may be completely filled with fuel. When the operating conditions change, for example, decreasing liquid level in the tank, the air cushion is formed again in the float housing.

6.3 Use in flood hazard areas

NOTICE

INOPERABLE PRODUCT

- Verify that the product (without vent hose) is replaced after a flood.

Failure to follow these instructions can result in equipment damage.

With a connected vent hose, the product is suitable for use in flood hazard areas; it is watertight up to 10 mH₂O (1 bar pressure).

The product with vent hose continues to be operative after a flood.

- ⇒ Verify that the end of the vent hose is located at the return connection of the tank or ends above the maximum possible water level.

7 Maintenance

7.1 Maintenance intervals

NOTICE

UNSUITABLE CLEANING AGENTS

- Verify that you use only cleaning agents which do not contain solvents for cleaning the plastic parts.

Failure to follow these instructions can result in equipment damage.

When	Activity
If required	Clean the plastic parts with soap suds
No later than after 20 years	Replace the product
After a flood	Replace the product if no vent hose is connected

8 Troubleshooting

Any malfunctions that cannot be removed by means of the measures described in this chapter may only be repaired by the manufacturer or by qualified persons.

Problem	Possible reason	Repair
Heavy fuel foam in the float chamber due to excessive amounts of air sucked in (in excess of the possible separation capacity > 4 l/h)	Suction line not tight	Perform a tightness test of the suction line (vacuum test or pressure test)
	Screw connections not tight	Seal the screw connections
	Initial commissioning without separate suction pump	Use a suction pump
	Suction line dimensions too great (DIN 4755)	Observe the flow rate 0.2 - 0.5 m/s (DIN 4755-2)
Burner switches off at irregular intervals due to malfunctions	Air accumulations in the suction line because pipe cross section is too great	Properly rate the suction line (see chapter "Determining the suction line length")
Liquid column cannot be sucked in or steady flow keeps being interrupted	Small leaks (for example, at the screw connections or the withdrawal fitting) can cause air to get into the suction line, even when the system is idle	Check all sealing surfaces for damage Close the shut-off valve at the withdrawal fitting. Perform a vacuum test (at least -0.6 bar) at the flow connection of the de-aerator
	Burner pump does not generate sufficient vacuum	Perform a suction test at the pump. The pump must generate a vacuum of at least -0.4 bar
Other malfunctions	-	Contact the AFRISO service hotline

9 Decommissioning, disposal

Dispose of the product in compliance with all applicable directives, standards and safety regulations.

1. Dismount the product (see chapter "Mounting", reverse sequence of steps).
2. Dispose of the product.

10 Returning the device

Get in touch with us before returning your product (service@afriso.de).

11 Warranty

See our terms and conditions at www.afriso.com or your purchase contract for information on warranty.

12 Spare parts and accessories

NOTICE

UNSUITABLE PARTS

- Only use genuine spare parts and accessories provided by the manufacturer.

Failure to follow these instructions can result in equipment damage.

Product

Product designation	Part no.	Figure
Automatic fuel oil de-aerator "Flow-Control 3/K"	69930	
Automatic fuel oil de-aerator "Flow-Control 3/K" (G1/4)	69978, 69954	
Automatic fuel oil de-aerator "Flow-Control 3/K HT"	69929	

Spare parts and accessories

Product designation	Part no.	Figure
Piston type anti-siphon valve "KAV"	20240	-
Diaphragm type anti-siphon valve "MAV"	20139	-
Vent hose, PVC, Ø 4 x 1 mm, 20 m reel	20696	-