Membrane controlled anti-siphon device

Type HS-V.2

Z-65.50-492

PROOFED BARRIER

BIO GEEIGNET

CONTENTS

ABOUT THESE INSTRUCTIONS

- These instructions are part of the product.
- Keep them in a safe place while you are using the product.
- These instructions must be observed and handed over to the operator to ensure that the component operates as intended and to comply with the warranty terms.

MODIFICATIONS COMPARED TO PREVIOUS VERSION

NOTE

- Installation location added.
- Information about the reinforcement ring added.

GENERALLY

The content of these instructions corresponds to the technical description for the general technical approval dated 2011-04-01. Additions that do not comply with the technical description are marked with a footnote in these instructions.

Installation, maintenance and start-up may only be carried out by companies that are specialist companies for this work in terms of Section 3 of the German Ordinance on Facilities Handling Substances Hazardous to Water (VAwS) from 31 March 2010 (Federal Law Gazette, P. 377). Unless, as the manufacturer of this product, GOK carries out the work with its own specialist employees. Installation may also be carried out by professional personnel. The labour law regulations are not affected by this.

REQUIREMENTS AND TESTS

The membrane controlled anti-siphon device type HS-V.2 fulfils the requirements for:

- a mechanical safety device to prevent siphoning of fuel from fuel tanks or from operating tanks of pumping units in the connected suction line, e.g. for supply systems according to TRÖ DIN 4755, TRÖl or supply systems according to TRöL (Austria) for fuel oil consumer installations according to DWA-A 791 (TRwS 791-1, draft),
- an anti-siphon device according to EN 12514-2: 2000-03,
- a shut-off device in terms of VAwS that prevents siphoning,
- a safety device as "protection against siphoning" according to worksheet DWA-A 779 for liquid substances that are hazardous to water,
- a construction product according to Building Rules List A Part 1 (edition 2012/1) No. 15.41 with attachment 15.14 with the general technical approval **Z-65.50-492**,
- an odour free fitting, quality label **PROOFED BARRIER**® from Qualitätsgemeinschaft geruchsdichte Heizöltanks e. V. for modern oil-fired installations.

WARNING
Leaking liquid fuels, such as fuel oil.
May cause you to slip and injure yourself and is also a hazard for groundwater.
✓ Capture fuels during maintenance.
✓ Observe the relevant laws and regulations.

LABELLING

e.g. 04.12	Month and year of manufacture	e.g.: April 2012
Type HS-V.2	Type designation	
HA = ... m	Set height difference	0.5 m - 4 m
HQ	Flood-proof construction element	according to E DIN EN 12514-1: 2009-06,
Z-65.50-492	General technical approval	Construction product according to Building Rules List A Part 1
PS 10 bar	Max. permitted working pressure 10 bar	according to EN 12514-2: 2000-03,
EN 12514-2: 2000-03,	Name of standard	Applicable standard for test requirements
	Compliance mark with the no. of the technical approval	Certificate of suitability for intended use issued by building inspectorate

INTENDED USE

The product may be operated in areas that are at risk of flooding or high water, but not in potentially explosive areas.

Operating media	Standard	Density ρ_{Fuel} in kg/m³
Fuel oil EL	DIN 51603-1	860
*)Fuel oil EL A and fuel oil EL A Bio 5 - 50	DIN SPEC 51603-6	860
*)Light fuel oil	ÖNORM C1108 (AT)	-
*)Extra light fuel oil (low sulphur) EL	ÖNORM C1109 (AT)	860
*)Extra light fuel oil with biogenic components EL	ONR 31115	-
*)FAME	EN 14213 / 14214	900
*)Diesel fuel	EN 590 and DIN 51628	840
*)Other liquid fuels	prEN 12514-1:2009 Annex A	-
*)Rapeseed oil fuel	DIN 51506	930
*)Vegetable oils, (such as cotton seed, soy, wheat germ, castor, palm, rapeseed, olive, coconut, sunflower, etc.)		-

*) Use of the product with these media is not an element of the general technical approval.

SAFETY DEVICE AGAINST SIPHONING

There is a risk of liquid fuels escaping while the burner/pump is not operating due to the pressure of the fuel column in the suction line if:

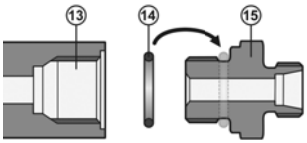
- the minimum liquid level in the tank is above the lowest point in the suction line (∆**H**),
- a feed line is below the highest level of the operating tank of a pump unit.

This is described as siphoning. A safety device against siphoning prevents this.

PRINCIPLE OF OPERATION

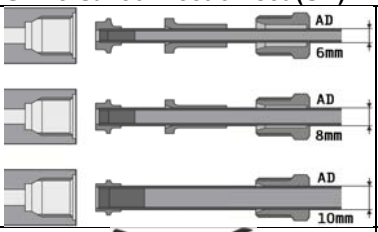
- If the feed system is not operating, the suction line is blocked by the spring-loaded valve in the HS-V.2.
- This valve opens with the vacuum generated when the pump unit starts up.
- If there is a leak in the suction line when the burner is not operating, the HS-V.2 remains closed and thus prevents fuel escaping.
- The HS-V.2 is equipped with an integrated safety device against excess pressure – known as a pressure relief valve. If, while the system is not operating, the pressure rises due to a rise in temperature, for example, the valve opens towards the tank in relation to the safety level that is set, approx. 0.2 ÷ 2 bar.

CONNECTIONS

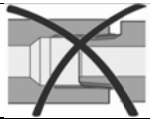


⑬ Female thread G 3/8 acc. to EN ISO 228-1, as screw-in opening G 3/8-UA-O acc. to prEN 12514-4:2009 Figure D.1
⑭ O-ring dimensions 14x2 mm, included with delivery
⑮ Screw-in connectors, type B acc. to EN ISO 1179-4 or prEN 12514-4 Annex C (adequate with type A acc. to DIN 3852-2)
The recommended maximum torque with steel screw-in connector is 15 Nm

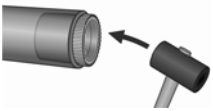
Universal connection set (UA):



The female thread can also take the GOK universal connection set type UA, which corresponds to a compression joint type G acc. to prEN 12514-4:2009 Annex D.
Piping used:
Copper pipe with outer diameter 6, 8 or 10 mm, e.g. acc. to EN 1057



The housing is made from a zinc die-cast alloy:
Do not use a conical pipe thread acc. to EN 10226-1.



NOTE
A reinforcement ring must be used with all thin-walled pipes and with soft pipe materials.

ATTENTION
Brass reinforcement rings may not come into contact with aluminium pipe. **Risk of corrosion!**

More information about compression fittings can be found at **www.gok-online.de** or on request.

ASSEMBLY

Before assembling, check that the product is complete and has not suffered any damage during transport.

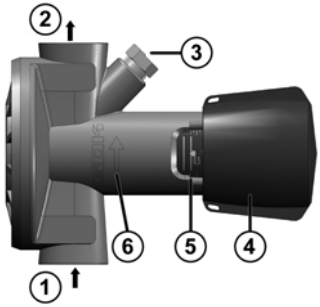
ASSEMBLY, START-UP and MAINTENANCE are to be carried out by a specialised company in terms of water law.

For the system to function as intended it must be installed professionally in compliance with the technical instructions applicable to the planning, construction and operation of the entire system.

- Before installation, visually check that there are no metal filings or residues in the connections. Blow them out to prevent any functional problems.
- Observe installation ➡ direction!

Tool
Assemble only with a suitable open-end spanner. Always brace against the connection bracket.
Do not use any other tool.

Figure 1: Installation position



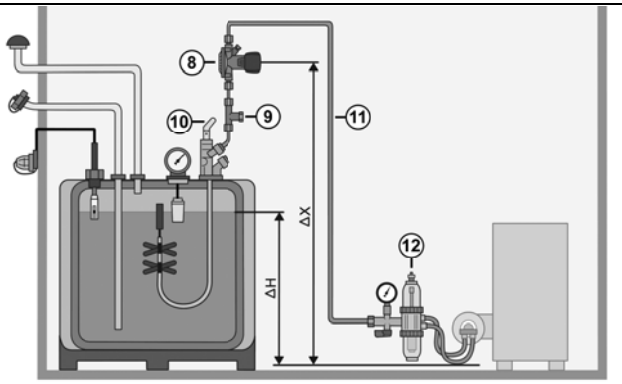
① Line from the tank or from the operating tank of the pump unit
② Line to the consumer
③ Blind screw (test manometer G 1/8)
④ Handwheel
⑤ Display for safety height
⑥ Arrow for flow direction

Installation location and installation position

NOTE

- The product is to be installed in the suction line always above **the maximum liquid level close to the tank.**
- It can be positioned where you wish, but to prevent gas bubbles forming, **vertical installation** is recommended.
- The product must be accessible for the required checks.

Figure 2: Fuel oil consumer installation in single conduit system



⑧ Anti-siphon device
⑨ Pressure compensation valve Typ DAV7
⑩ Withdrawal valve Typ VTK-2
⑪ Aspiration line
⑫ Combined fuel oil filter and deaerator Typ GS Pro-Fi 3

The product may be installed in suction lines of supply systems for liquid fuels

- In single conduit systems with and without a return line.
- If you change from a two conduit to a single conduit system, the dimensions of the suction line must be adapted.
- **Recommendation:** Install a fuel oil deaerator.

In a double conduit system, you must observe the following

- As a result of the higher vacuum, you may experience noises and disruptions and damage to the pump. Determine the pressure loss. Maximum suction pressure of the burner pump $\Delta \mathbf{p}_{Pump}$ = -400 mbar.
- In tank systems or battery tanks with a return line, if the withdrawal system malfunctions (e.g. due to contamination), the return flow may cause varying levels and, because of this, result in overfilling.
- For water protection reasons, a single conduit system is always preferable. This applies especially to systems with no retention facility. If a two conduit system is necessary for technical reasons, the return line must be outside the retention facility, e.g. with secure connections.

The product may also be installed:

- In suction lines behind pump units with an operating tank.
- In domes of underground tanks.

NOTE

In suction lines ⑪ you cannot rule out that the permitted working pressure will be exceeded, for example, due to thermal expansion of an enclosed volume of operating medium.

This requirement can be fulfilled with the following measures:

- Installation of a suction kit ⑩ on the oil tank **with no** non-return valve (GOK Type: VTK-2-S, VTK-2-SM).
- Installation of a pressure compensation valve ⑨ that limits pressure increase in an enclosed section of piping if a non-return valve is installed. See installation and operation instructions for "Pressure compensation valve", part no. 15 550 50.

Installation in a dome
Install the product horizontally so that the top with the ventilation opening for the membrane faces downward. This allows any condensation that forms to run out.
Recommendation: Install a filter.

NOTE
Installation behind pump units with an operating tank.
The actual height difference ∆**X** is the difference between the installation position of the HS-V.2 behind the pump unit and the lowest point in the suction line.

Adjusting the anti-siphon device - HA according to the actual height difference ∆X
For the height setting **HA** of the HS-V.2, the actual height difference ∆**X** is decisive. If the height ∆**X** is greater than **HA**, the pressure of the fuel column behind the anti-siphon device is higher. The opening pressure $\mathbf{p}_{o,o}$ must therefore be higher than the pressure of the fuel column for the HS-V.2 to function properly.

NOTE
Operating safety: Adjust **HA** so that the actual height difference ∆**X** is just safeguarded.

Higher **HA** values lead to greater opening pressures $\mathbf{p}_{o,o}$ and, consequently, to higher vacuums in the suction line and increased formation of gas bubbles.

1. Measure the height difference ∆**X** between the installation position of the anti-siphon device and the lowest point of the suction line – generally, the hose on the floor in front of the point of consumption.

✓ The setting for the safety level according to Points 3 and 4 applies for fuels with a maximum density of ≤ 860 kg/m³, e.g., fuel oil EL.

2. Set the correct safety level from the measured height difference ∆**X**:

Type	Height setting **HA** in m	$\mathbf{p}_{o,o}$ in mbar	Pressure loss ∆**p**v at V in mbar	
			40 l/h	220 l/h
HS-V.2	0.5	-75	-	-
	1.0	-115	< 5	40
	2.0	-200	< 10	47
	3.0	-284	< 10	52
	4.0	-366	< 10	60

3. Set measured height difference ∆**X ≤ HA** on the scale using the handwheel (see **OPERATION**).

NOTE

4. If the density of the operating medium **is greater than 860 kg/m³**, a conversion to the corrected height setting **HA** is required. A higher vacuum is generated in the liquid column $p_{o,g}$. The density of the stored operating medium must be known. Ask your mineral oil merchant. If the safety level is not corrected, there is no protection against siphoning.

Set the safety level HA as follows:

$HA^* = \frac{\Delta X \cdot \rho_{Fuel}}{860}$	ΔX in m ρ_{Fuel} in kg/m³

NOTE

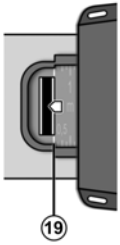
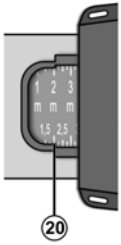
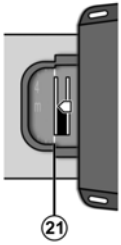
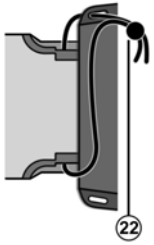
If the density of the operating medium **is less than 820 kg/m³** the setting for the safety level can be reduced when **HA*** has been determined. This is beneficial in case of larger height differences to reduce the vacuum in the suction line.

5. To check the anti-siphon device, refer to **FUNCTION CHECK.***)

*) Is not an element of the technical description for the general technical approval.

OPERATION

Figure 3: Adjusting the anti-siphon device with the handwheel ⑰

⑱	⑲	⑳	㉑	㉒
Reading position	"Ventilate"	Operation, e.g. HA = 2 m	"Block". e.g. maintenance	Seal
				

NOTE

When the specified closing moment ㉑ is reached, the handwheel can be turned freely.

When the supply system is running, the product may not be operated at the following positions:

⑲ "Ventilate": The anti-siphon device is deactivated, the suction line is not protected.
㉑ "Block": The anti-siphon device is blocked and does not open in case of a vacuum. This position enables maintenance work to be carried out on the suction line, for example.

NOTE

Never start the burner pump in the "block" position.

The burner pump may be damaged or it can become too hot and malfunction.

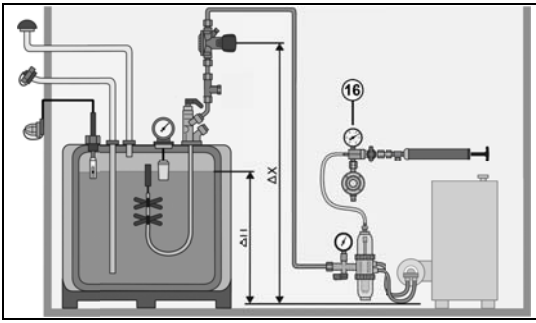
1. Make sure that the burner pump runs only in the "operation" position.

START-UP

If a pressure test has to be carried out in the piping before the supply system is put into operation (e.g. according to DIN 4755 or TRÖI), a test pressure of max. 6 bar can be applied. A vacuum test according to TRÖI - Section 4.10.4.2 is recommended. "Leak test with vacuum" (see ⑯).

- Check that the product is installed properly
- Check that the product and the connection do not leak within the scope of the recurring checks of the supply system. Repair leaks!

Figure 4: Test equipment



Recommendation ⑯:
GOK Vacuum test kit UPE 300 Part No.: 13 602 00 (without vacuum pump)

- Test vacuum -300 mbar.
- Test the complete supply system from the tank withdrawal fitting to the burner for leaks. Possible before start-up.

The vacuum gauge (optional) does **not** have to be removed.

The anti-siphon device can be included in the pressure and leak tests if it is set to "ventilate" - see **OPERATION.**

- Observe the consuming appliance manufacturer's instructions for start-up.
- The time required for starting up the supply system can be reduced by **VENTILATING** the anti-siphon device. The handwheel must be set to the safety level **HA** and be sealed so that it cannot be adjusted without authorisation.
- Carry out a **FUNCTION CHECK** and **do not ventilate anymore!**

FUNCTION CHECK

VENTILATE the suction line (Figure 3).

Option 1:

- Start the pump unit at the point of consumption - generally the burner pump.
- Ensure stable operation.
- Switch the pump off.
- Loosen the connection/screws at the lowest point of the suction line - generally the hose to the consumption point.
- No operating medium should run out.

NOTE
If there is air or gas in the suction line, the suction line will empty completely. There should be no subsequent escape of medium.

Option 2 (if a test manometer is used):

NOTE
Option 2 is in preparation.

MAINTENANCE

After proper assembly and operation, the product is maintenance free.

Check HS-V.2 at appropriate intervals, **at least every 5 years**:

- Proper installation position (see Figure 1).
- Check that the safety level HA matches the actual height difference ΔX.
- Switch the pump on an off several times. While doing so, make sure that the anti-siphon device closes and opens.
- Carry out a **FUNCTION CHECK**.

REPAIRS

If the measures explained above under START-UP and OPERATION do not result in regular START-UP, and if there is no dimensioning problem, the product must be sent to the manufacturer for a check. Our warranty does not apply in cases of unauthorised interference.

The product may be cleaned and maintained only by companies such as those described in INSTALLATION.

If the burner malfunctions during operation ➜ carry out a check:

- Check for leaks at the connection elements of the anti-siphon device:
  Is the o-ring ⑭ in a good condition?
  In copper pipes, is the compression fitting with reinforcing ring okay?
- Choose the correct inside diameter of the piping:
  Choose the inside diameter to suit the actual flow rate.
- Measure the suction pressure at the burner pump with the specification ΔpPump ≤ - 400 mbar.
  Is it > 400 mbar?
  - Check for leaks and/or check the height setting HA
  - Reduce any excess heights in the piping (max. 4 m)
  - Reduce pressure loss in the suction line, e.g. with different fittings, elbows, etc.
  - Check for contamination in the complete suction line, rinse if necessary
- Height setting HA corresponds to the actual height difference ΔX.

The anti-siphon device must be replaced with a new one:

- after flooding,
- if fuel escapes from the anti-siphon device.

In the event of inadmissible operating pressures > 10 bar caused by temperature-related changes in volume, the membrane is destroyed, which, in turn, destroys the anti-siphon device.

Replacement

According to DIN 4755, membrane-controlled components, such as safety fittings against siphoning, must be replaced every 10 years at the latest. Replacement is not necessary if it is confirmed that the product still functions properly.

NOTE

In case of flooding, the anti-siphoning protection is reduced.

For each metre of water column above the membrane-controlled anti-siphon device HS-V.2 the protection against siphoning is reduced by 1.50 m on average.

✓ No safeguard is guaranteed then.

DISPOSAL

To protect the environment, oil-saturated products may not be disposed of along with household waste or in public waters or sewage systems.
The product must be disposed of via a local collection station or a recycling station. If you do not have any possibilities for proper disposal, contact us regarding disposal options.

TECHNICAL DATA

Temperature of medium	0 °C to +40 °C
Housing material	ZP0410
Safety level of type HS-V.2	0.5 m to 4 m
Flow rate of medium	220 l/h
Piping connection	Both sides IG G 3/8

Ambient temperature	-25 °C to +40 °C
max. flooding height	10 m
Test manometer connection	G 1/8, closed blind
max. permitted pressure	PS 10 bar

Important for any warranty claims

To be kept by system operator

Installation certification from specialised company

Membrane-controlled anti-siphon device type HS-V.2

I hereby confirm that the anti-siphon device type HS-V.2 was installed in accordance with the valid installation and operation instructions. After INSTALLATION, the device was started up and CHECKED.
The anti-siphon device type HS-V.2 functioned correctly on the start-up date.

❑	Year of manufacture		
❑	Type HS-V.2	with adjustable safety level between HA = 0 ÷ 4 m **Set HA**	= m
❑	Height ΔH	Height difference between the maximum filling height of the tank and the lowest point of the suction line	= m
❑	Height ΔX	Height difference between the installation position of the HS-V.2 membrane-controlled anti-siphon device and the lowest point of the suction line	= m
❑	Operating medium	❑Fuel oil EL	

Address of the operator	Address of the specialised company
Place, date	Specialised company (stamp, signature)

Recurring FUNCTION CHECK

The anti-siphon device type HS-V.2 was subject to a recurring FUNCTION CHECK and functioned correctly at this time

Place, date	Specialised company(stamp, signature)