KROHSE GMBH

EN

Operation manual

Flaring device

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Version: 02-2022

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Foreword

Dear Customer,

Thank you for your purchase. With this flaring device, you have chosen a high-quality and easy-to-handle product. To ensure that you can work reliably and safely with this device for years to come, we would like to draw your attention to the user information presented in this manual. KROHSE GmbH has made every effort to manufacture a safe and robust product conforming to all applicable laws and regulations. Strict pre-delivery quality checks undertaken in our factory are key to maintaining our high quality standards. Please continue to maintain our standards by treating the device with care. If you have any questions on how to use the device, please contact us at any time.

We wish you every success and hope that you enjoy working safely on your supply line.

Thomas Krohse
KROHSE GmbH

1 Function and operating principle

A flaring device is designed to burn off residual gases in a controlled manner so that they do not enter the atmosphere and form ignitable mixtures or contribute to environmental pollution. In principle, the flaring device can be used for two different applications:

a) Degassing (emptying a gas line)
During gas line repair work, the line must be free of gas for safety reasons. After the gas supply has been shut off (e.g. by inflatable stoppers), the residual gas remaining in the line is safely tapped, withdrawn and combusted in a controlled manner using a flaring device.

b) Gassing (filling a gas line)
When a gas line is being put into service, it is necessary to purge the pipe section of all air by the controlled introduction of gas. This means replacing the air in the line with gas. Until the line has been completely filled, an explosive gas-air mixture is released. This is drawn away and combusted in a safe and controlled manner by the flaring device.

2 Technical specification

The flaring device is suitable for use under the following conditions:

- Pressure range: 5 mbar to 5 bar
- Temperature range: -20 °C to +70 °C
- Volumetric flow: See charts (Figure 4: and Figure 5: on page 8)

Technical data:

- Total height 2245 mm (PRO) / 2170 mm (STANDARD) in ready-to-use condition
- Manufactured from stainless steel 1.4301 DN 25 (1"), glass-bead blasted
- Flame flashback/gas backflow arrester (DVGW-certified)
- With integrated prefilter mesh size 0.1 mm (fitted to the main pipe)
- Degassing hose GWPB DN 19 x 4.5 mm for propane/natural gas, PN 20, ISO 3821

Transport trolley dimensions

L x W x H: 1199 mm x 419 mm x 234 mm
Weight: 15 kg flaring device + 15 kg transport trolley including accessories

Variants

The variants of the KROHSE GmbH flaring device differ in the material used for the flame flashback/gas backflow arrester (brass or stainless steel) and in their operation with or without a Venturi nozzle (for evacuating the line).

	Brass	Stainless steel
Without Venturi nozzle	**ECO-Standard** **Item no.: 9020000** 	**PREMIUM-Standard** **Item no.: 9020005** 
With Venturi nozzle	**ECO-PRO** **Item no.: 9020010** 	**PREMIUM-PRO** **Item no.: 9020015** 

Table 1: Overview of flaring device variants

3 System components

The system components are designed for use in the gas supply and have the specifications described below.

Figure 1: *Transport trolley*

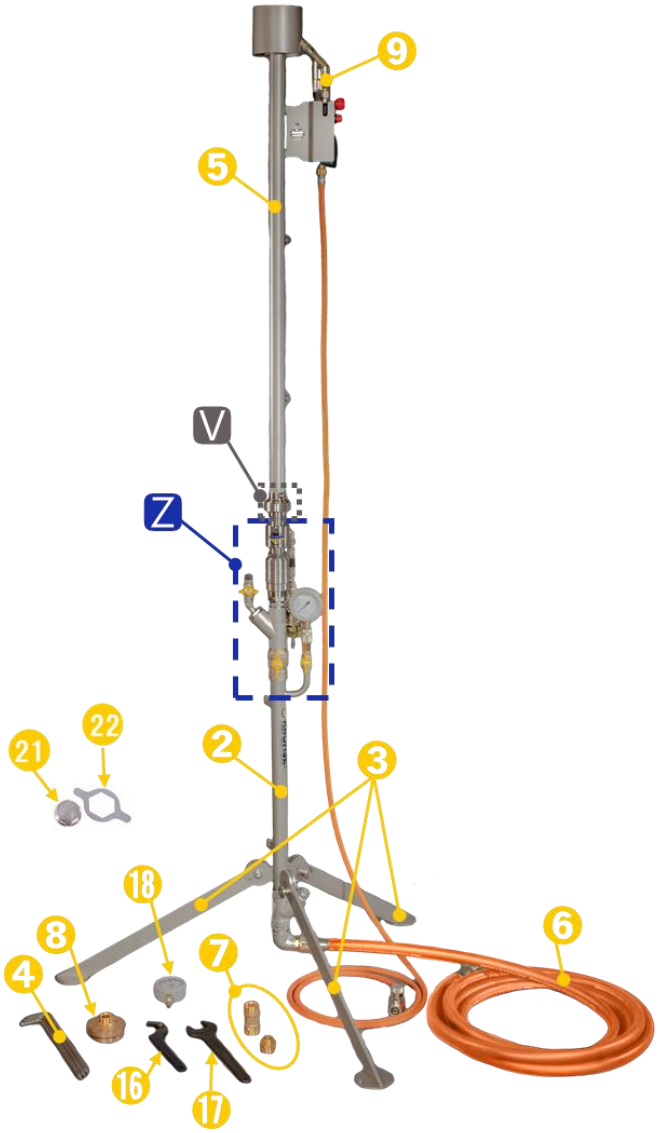


Figure 2: *System components*

Figure 3: *Main valve unit*

	Component	Item no.	Specification
1	Transport trolley	9050000	HPX
2	Lower riser module with main valve unit (Z) and folding feet (3)		Stainless steel 1.4301
4	Ground pegs (2 pcs)	1420005	Stainless steel 1.4301
	Ground peg with cable socket (1 pc)	1420045	Stainless steel 1.4301
5	Upper riser		Stainless steel 1.4301
6	Degassing hose set	8050090	GWPB DN 19 x 4.5 mm for propane/ natural gas, PN 20, ISO 3821 (free choice of length) with brass coupler at both ends (female taper G1" ET)
7	Coupler for degassing hose 1" ET x 1" ET (1 pc)	1460085	Brass, both ends Female taper with G1" ET
8	Connection adapter • 2 ½" ET (1 pc) • ¾" ET (2 pcs)	 1460040 7370232	Brass
9	Piezo burner set for secondary flame including propane gas hose and pressure reducer	5520051 5528012 5526001	Piezo burner, LH ⅜" Propane gas hose, 4 m, LH ⅜" Pressure reducer 1.5 to 4 bar, internal thread 21.7 x 1.814 G
Z	**Main valve unit**		
10	Flame flashback/gas backflow arrester	1460045 1430015	**ECO**: Brass (2.0401) **PREMIUM**: Stainless steel (1.4301)
11	Main shut-off valve*	1360020	Nickel-plated brass
12	Test port for measuring the gas concentration with shut-off valve* and male coupler set	1360015 1460020 1460080 1460130 1450000	Ball valve, nickel-plated brass, G¼" IT Rectus male coupler, DN 2.7 Rectus male coupler, DN 5 Screw-in connection with PU hose, 6 x 4 mm Blanking plug, PVC G¼" ET
13	Pressure gauge connection with quick coupler and shut-off valve*	7360824	Nickel-plated brass
14	Optional: Venturi nozzle with compressed-air connection (15) and shut-off valve*	1420025	**PRO**
16	Hook spanner 60–90 mm	7370114	Phosphated steel with joint
17	Single open-ended spanner, 36 mm	9070036	Phosphated steel
18	Pressure gauge -1–1.5 bar Pressure gauge -1–5 bar	1020000 1020005	63 mm diameter, Cl. 1.6, glycerin-filled 63 mm diameter, Cl. 1.6, glycerin-filled
19	Flat seal	8050050	NBR 70 Shore A, 44 x 33 x 2 mm diameter
20	Earthing cable	1450035	90 cm, connector on both ends, 25 mm²
21	Sound suppressor G 1" ET WAF 36	1420055	Stainless steel 1.4301
22	Assembly spanner	1420070	Stainless steel 1.4301

Table 2: Specification of system components

***** All ball valves with a yellow handle, including the valve with the grey handle for the compressed-air feed at the Venturi nozzle, are DVGW-certified. A certificate is provided in Appendix 15.2.

Flaring device pressure-flow charts

The following chart describes the pressure-flow behaviour of the flaring device.

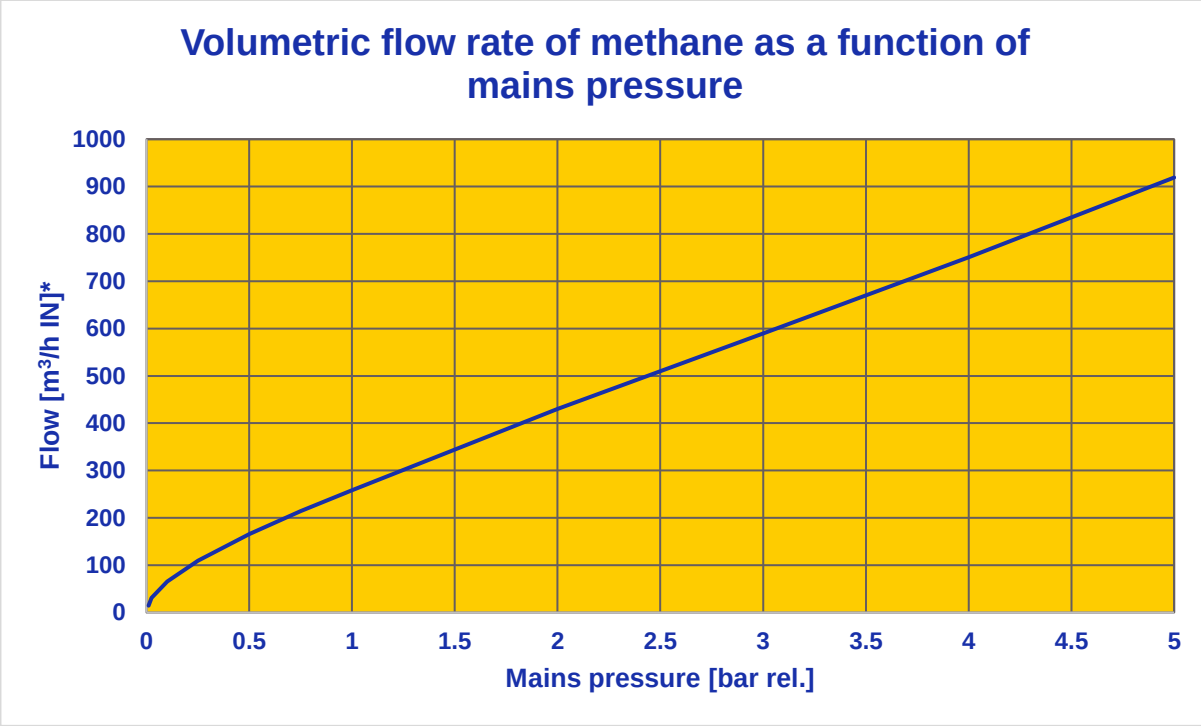


Figure 4: *Volumetric flow rate of methane as a function of mains pressure*

For Pro versions only: The chart below describes the relationship between the inducted volumetric flow rate and the outlet pressure at the compressor with a Venturi nozzle connected.

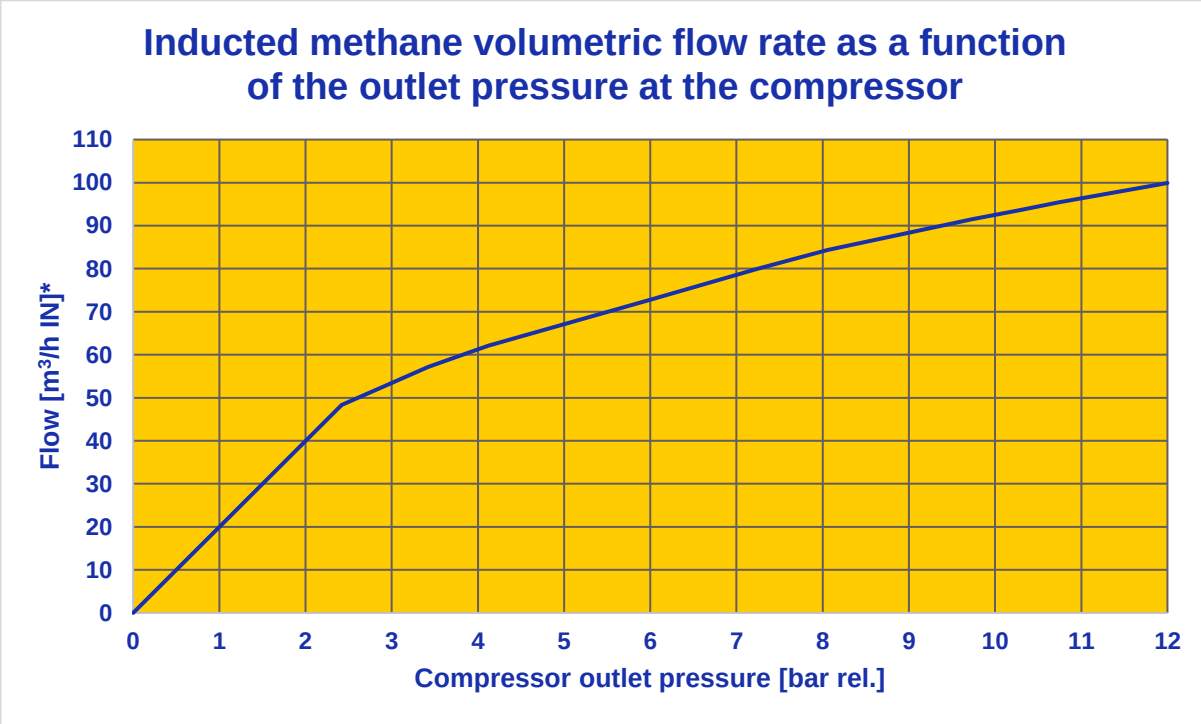


Figure 5: *Relationship between inducted methane volumetric flow rate and the compressor outlet pressure at the compressor*

* Explanation of Y axis in Figure 4: and Figure 5:
m³/h IN ≙ standard cubic metres per hour at 0 °C & 1013.25 mbar.

4 Safety and responsibility

This section provides an overview of all relevant safety aspects for the optimum protection of persons as well as safe and trouble-free operation. Keep the operating instructions manual with the safety information for future reference.

4.1 Warning signs

For your own safety, it is important to read and fully understand the following table with the various warning signs and their definitions.

Symbol	Definition
DANGER	Warns of an imminent hazard that, if not avoided, will result in death or serious injury. ► Measures to avoid the hazard.
WARNING	Warns of an imminent hazard that, if not avoided, could result in serious injury. ► Measures to avoid the hazard.
CAUTION	Warns of a hazardous situation that, if not avoided, could result in minor or moderate injury. ► Measures to avoid the hazard.
	Warns of flammable materials (ISO 7010 – W021).
EX	Warns of explosive substances (DIN 4844-2 – D-W021).
	Warns of the presence of gas cylinders (ISO 7010 – W029).
ATTENTION	Indicates a hazardous situation that, if not avoided, could result in physical damage. However, no actions in respect of personal injury are necessary. ► Measures to avoid the damage.

Table 3: Warning signs

4.2 Signs and symbols

Symbol	Definition
CE	This sign means that your device meets the safety requirements of all applicable harmonised EU directives.
	Notes: Contain particularly important information for understanding.

Table 4: Signs and symbols

4.3 Intended use

The flaring device is intended exclusively for burning off natural gas (methane), propane and biogas in a controlled manner so that they do not enter the atmosphere and form ignitable mixtures or contribute to environmental pollution.

The device may be operated only by trained personnel. Intended use also includes observing this instruction manual. The maintenance intervals must be strictly observed.

Have your device repaired only by qualified professionals and only with original replacement parts. This ensures that the safety of the device is maintained.

Keep the device away from rain or moisture. The ingress of dust or water into the flaring device could impair the throughflow of the medium.

For cleaning, do not use any solvents. Otherwise, the surface of the device and its seals could be damaged. Use only a silicone spray, which should also be used for lubricating the locking pins.

4.4 Improper use

Any use not described above or any use that does not comply with the technical specifications is considered improper use. The user bears sole responsibility for any damage or loss arising from improper use.

The following types of use are prohibited:

- Use of the device in environments where corrosive liquids could enter the components.
- Introduction of any objects into the medium-conveying components of the flaring device.
- The attachment of non-system-compliant components or the swapping of components is not permitted. This would invalidate the warranty and the manufacturer shall accept no liability.

The following safety information indicates hazards of a general nature that may arise when handling the flaring device. To minimise the severity of the hazard, the user must observe all the rules of conduct listed.

Symbol	Definition
 	 **DANGER** Risk of fire and explosion. ► Never use in enclosed spaces. ► Operation of the flaring device with natural gas flowing out is permitted only if full personal protective equipment is being worn (flame- and heat-resistant protective clothing including head protection, safety goggles and gloves). ► Never aim the flame at a person or flammable objects nearby.

Symbol	Definition
	CAUTION Equipment damage caused by incorrect transport and storage. ► For transport and storage, always use the intended carry case.

Table 5: Warnings – improper use

In this manual, you will find additional warning notes for every action that involves a potential hazard.

4.5 Product safety with factory test report

The flaring device was designed and constructed based on state-of-the-art standards and practices. KROHSE GmbH takes its responsibility as the manufacturer of this safety-critical device seriously and carries out a two-step leak test on each device before it leaves the factory. The complete fitness for purpose is confirmed in a test report enclosed with the device.

The components of the flaring device and the supplied accessories are specifically designed to work together.

DANGER

If the device is used incorrectly or in a modified way, hazards could arise for the user, third parties and the environment, for which KROHSE GmbH shall bear no responsibility.

- ► Use only the original components and replacement parts from KROHSE GmbH
- ► Do not use any other complementary goods (hoses, adapters, fittings)
- ► Observe the instructions and requirements for pressure and use. Modifications are prohibited without the written consent of the manufacturer.

The natural gas flaring device must be operated only by persons who have received appropriate training in respect of the following:

- Working on gas-carrying lines,
- Knowledge of the danger posed by the natural gas flowing out,
- Proficiency with the function principle of the natural gas flaring device and
- Reading and understanding the operating instructions.

Standards:

- SVGW G2

Safety rules:

- SUVA “Erdgasleitungen: So arbeiten Sie sicher.” (Natural gas lines: Safe working practices)
- Occupational health and safety rules BGR 500 Section 2.31 “Arbeiten an Gasleitungen” (Work on gas lines)

4.6 Declaration of conformity

With the following declaration of conformity, KROHSE GmbH confirms that the described flaring device is in conformity with the applicable directives.

KROHSE GmbH
Gewerbestrasse 2
CH-8212 Neuhausen am Rheinfall

EU-Konformitätserklärung

im Sinne der

- **EU-Richtlinie Druckgeräte 2014/68/EU**

Bezeichnung: Abfackelgerät
Gerätekennzeichnung: Baujahr / Chargen Nr. – Geräte Nr. (siehe Kap. 3.1)
Herstellerjahr: ab 2020

Die **alleinige Verantwortung** für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.

Richtlinie / Norm	Titel
SVGW G2	Regelwerk – Richtlinie für Rohrleitungen
SUVA	„Erdgasleitungen: So arbeiten Sie sicher“
DGUV Regel 100-500	Betreiben von Arbeitsmitteln Kap. 2.31, Arbeiten an Gasleitungen

Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union.

Die oben aufgeführten harmonisierten Normen wurden zugrunde gelegt.

- Bevollmächtigte Person für die Zusammenstellung der technischen Unterlagen:
  Name: Herr Krohse
  Anschrift: Gewerbestrasse 2, CH-8212 Neuhausen am Rheinfall

Neuhausen am Rheinfall, den 06.03.2021

.....
Unterschrift Geschäftsverantwortlicher
(Thomas Krohse, Geschäftsinhaber)

4.7 Guarantee

The flaring device is covered by a guarantee of twelve (12) months.
It begins from the delivery of the goods.

4.8 General terms and conditions of business

The currently valid general terms and conditions of business of KROHSE GmbH apply.
These can be downloaded from www.krohse.ch/download/.

5 Kit contents

The flaring device is delivered with the following components in a robust carry case:

Ⓐ Riser unit with lower riser module ❷, main valve unit Ⓩ, folding feet ❸ and attached upper riser ❺.	⓬ Test port connector set: - Rectus coupler DN 2.7 (1 pc), - Rectus coupler DN 5 (1 pc), - Screw-in connection with PU hose 6 x 4 mm (1 pc) - PVC blanking plug, ¼" ET
❹ Ground pegs (3 pcs)	⓰ Hook spanner 60–90 mm (1 pc)
❻ Degassing hose set (free choice of length)	⓱ Single open-ended spanner 36 mm (1 pc)
❼ Coupler for degassing hose	⓲ Pressure gauge (1 pc -1—1.5 bar / 1 pc -1—5 bar)
❽ Connection adapter 2 ½" (1 pc), ¾" (2 pcs)	⓳ Flat seal (2 pcs)
❾ Piezo burner set with propane gas hose and pressure reducer	⓴ Earthing cable (1 pc)
	㉑ ㉒ Sound suppressor including assembly spanner (1 pc each)

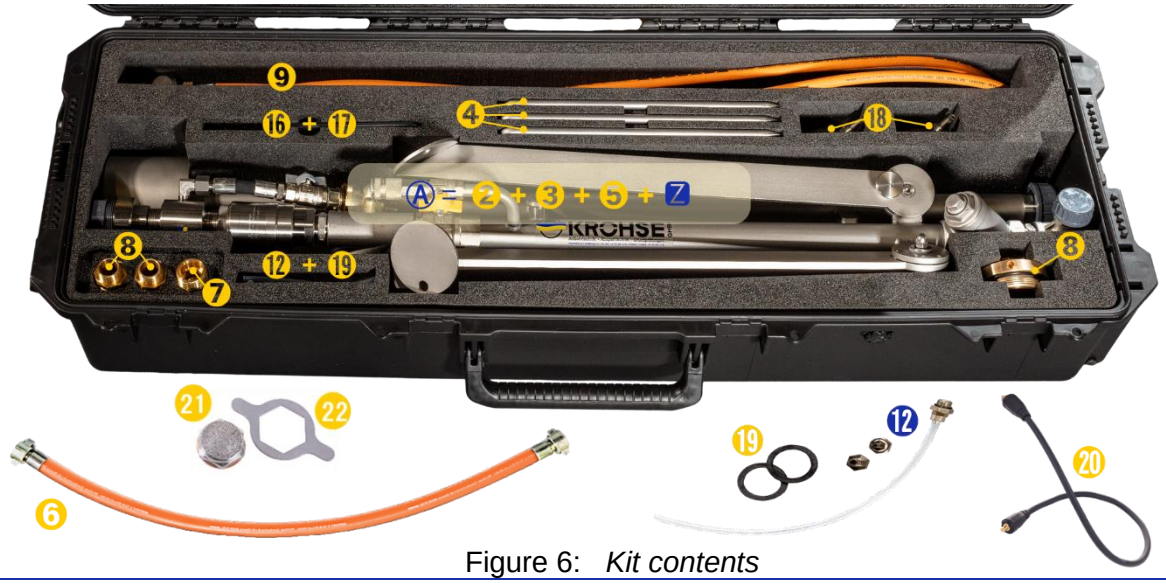


Figure 6: *Kit contents*

Necessary supplementary products (not included)

- Personal protective equipment (PPE) for working on gas lines
- Warning signs
- Gas detector
- Propane gas cylinder (preferably transparent for fill level checks)
- Plastic mallet or non-sparking tool for ground pegs
- Information about the affected line section (operating pressure, volume, surrounding shut-off valves, medium)

Only when using a Venturi nozzle

- Construction site compressor for oil-free compressed air with pneumatic dog clutch (min. 6 bar to max. 12 bar)

6 Assembling the flaring device

6.1 Tools for assembly/disassembly

All connections required for assembling/disassembling the flaring device can be tightened or untightened either by hand or with the supplied assembly spanners.
To secure the feet safely in the ground, you require a **plastic mallet** or a metal hammer made of a **non-sparking material** to drive in the ground pegs.

6.2 Prerequisites for setting up the flaring device

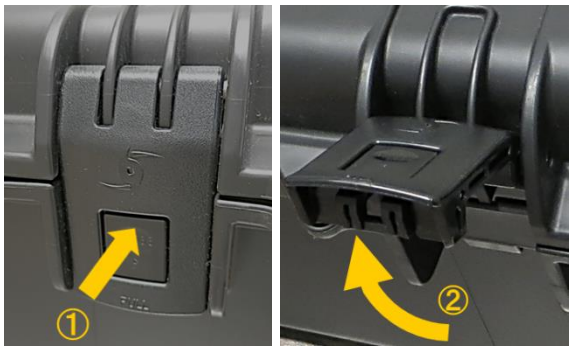
Make sure that the flaring device is set up on a **flat and stable surface**. Choose a safe and hazard-free location that

- is completely clear above the open flame.
- is free of vegetation, electrical devices or other sources of ignition in the high-risk work area.
- poses the lowest possible hazard potential for your own personnel and third parties.
- can be quickly and safely evacuated and has at least two escape routes in different directions.
- as far as possible minimises noise emissions for the surrounding population.
- For securing on asphalt-surfaced ground, the feet must be secured to ground plates or similar.

6.3 Assembly and set-up

6.3.1 Opening the transport trolley

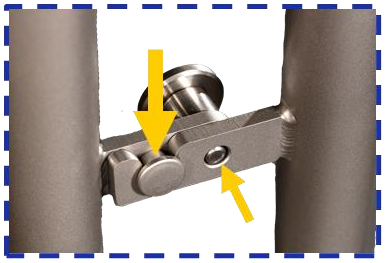
Place the transport trolley ❶ on a flat and stable surface. Open the six (6) trolley tabs. To do this, first press the tab catch inwards (step ①) and, with the catch pressed in, fold the trolley tabs upwards (step ②).



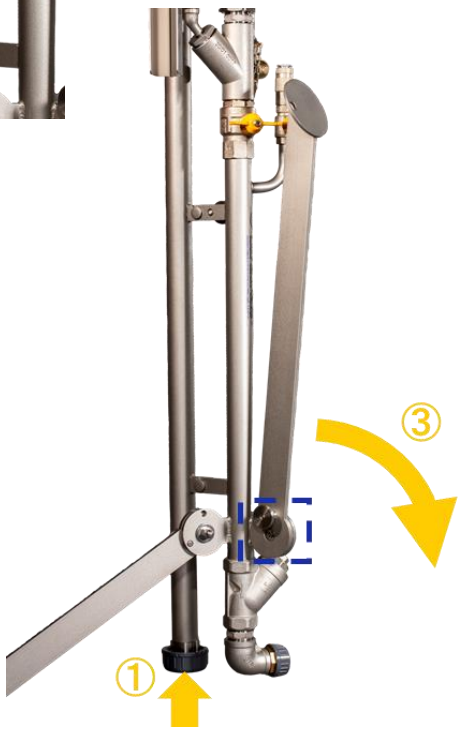
6.3.2 Erecting the lower riser module

Remove the riser unit Ⓐ (comprising lower riser module ❷ with main valve unit Ⓩ and folding feet, and the attached upper riser) from transport trolley ❶.

Make sure that the upper riser is securely attached in the bracket and locked in place by the two locking pins.



Now, at the chosen work position, carefully stand the riser unit Ⓐ vertically on the grey PVC protective cap that seals the upper riser (step ①). Loosen the locking pins (step ②) and fold all three feet down (step ③) until you hear the sprung locking pins engage and the feet are locked in position.

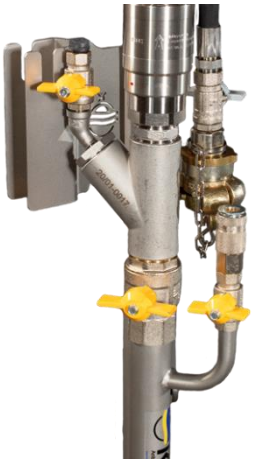


Now ensure safe footing by driving in the ground pegs ❹ using a plastic mallet or a metal hammer made of a **non-sparking material** until they are flush with the ground. Make sure that the ground peg with the earth connection is pointing towards the riser and do not connect the cable until after the peg has been driven in.

For protection against unwanted sparking, connect the black earthing cable ⓴ to the socket provided on the lower riser ❷, and now connect the earthing cable to the earthing socket on ground peg ❹. Be sure to plug the connectors into the sockets fully and turn them clockwise to secure.

Check that all valves of the main valve unit Ⓩ are easy to operate. Now close all of the valves to prevent the inadvertent escape of gas during assembly.

All yellow valve levers must be in a horizontal position.



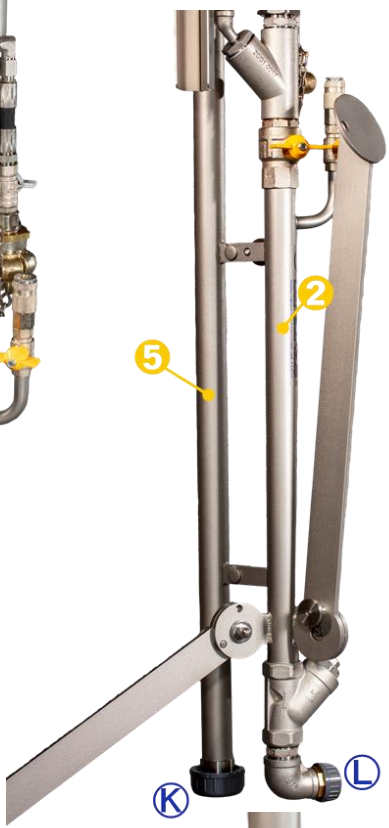
6.3.3 Assembling the upper riser

To avoid extreme noise emissions during flaring from medium-/high-pressure lines or during the evacuation of residual gas through the Venturi nozzle, you have the option to fit a sound suppressor (21) to the designated 1" internal thread of the diffuser on the upper riser. This achieves a noise reduction of approximately 50%. Screw the sound suppressor in hand-tight using the assembly spanner (22).

Loosen all three grey PVC protective caps/plugs (Ⓙ, Ⓚ and Ⓛ) and return them to the transport trolley for safekeeping.

As you loosen the protective plug Ⓙ, take care not to lose, damage or contaminate the flat seal (19) on the connection point.

Release the upper locking pin and remove the upper riser (5) from the brackets on the riser unit (2).



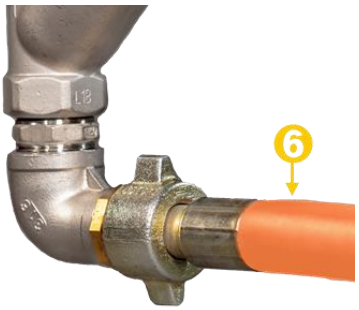
Now fasten the upper riser to the lower riser at the connection point Ⓥ. Ensure that

- The upper riser is aligned with the lower riser,
- The flat seal (19) is positioned centrally,
- The threaded connection can be screwed together easily.

Fasten the connection hand-tight first. Then further tighten the connection through 30–45° using the two assembly spanners (16) and (17).

6.3.4 Fitting the degassing hose

Now fasten one end of the degassing hose ⑥ to the elbow of the lower riser hand-tight using the threaded coupler (O-ring – taper).



Fasten the other end of the degassing hose to the natural gas line or the inflatable stopper installer hand-tight.

If required, use the supplied connection adapter ⑧ ¾" or 2 ½" (for connection to a ball valve).

6.3.5 Fitting the piezo burner

Take the piezo burner set ⑨ from the transport trolley and attach the piezo burner to the designated bracket on the upper riser.

Swivel the burner nozzle into the designated opening in the diffuser (step ①). Now slide the burner downwards until it fully engages in the bracket (step ②).

Then screw the connection on the pressure reducer (at the opposite end of the orange propane gas hose) onto the **left-hand** thread on the propane gas cylinder and fasten gas-tight.

6.3.6 Pressure gauge connection

Select the appropriate pressure gauge ⑱ for your intended working pressure range:

- -1—1.5 bar
- -1—5 bar

Slot the pressure gauge ⑱ into the designated opening in the pressure gauge connection ⑬ until you hear it engage.

7 Preparations for safe operation

DANGER

During work on live natural gas lines, there is a risk of fire and explosion.

► For this reason, the applicable national safety rules and regulations must be strictly observed.

For example:

- Swiss National Accident Insurance Fund SUVA “Erdgasleitungen: So arbeiten Sie sicher.” (Natural gas lines: Safe working practices) Or
- Occupational health and safety rules BGR 500 Section 2.31 “Arbeiten an Gasleitungen” (Work on gas lines)

In particular, note that:

- Work on gas lines must be carried out only by suitable, reliable and trained personnel.
- Only those persons are permitted in the hazard zone who are directly involved in the work.
- Personnel must wear the prescribed personal protective equipment (with flame- and heat-resistant protective clothing including head protection, safety goggles and gloves) during operation of the flaring device.
- There must be no sources of ignition, electrical devices or vegetation present in the work area.
- There must be no possibility of sparking, e.g. caused by passing road vehicles, railway vehicles and non-explosion-proof construction machinery or by electrical (battery change) or electrostatic discharge events.
- The hazard zone must have been clearly demarcated using appropriate warning signs.

8 Commissioning

Before your flaring device undergoes commissioning, make sure that

- The propane gas cylinder is large enough and sufficiently filled for the entire duration of the work.
- The secondary flame does not go out at any time during operation.
- The work remains possible even if there is a sudden gust of wind.

8.1 Function and leak testing before commissioning

As preventive safety measures, the following tests and function checks must be carried out before the start of the flaring process.

Test	Remedial measure
8.1.1 Propane gas line leak Open the propane gas cylinder but leave the controller on the burner closed for the time being. Now inspect the connection points.	► If leaks are found, the propane gas supply must be interrupted, the line must be vented and the connections retightened or components (seals/hoses) replaced.
8.1.2 Leak test Make sure that all valves on the flaring device are closed. Open the shut-off valve on the gas line. Now check the leak-tightness of the connection points of the degassing hose all the way to the flaring device using a gas detector or by using soapy water.	► If leaks are found, the gas supply at the shut-off valve of the natural gas line must be closed, the line must be vented and the connections retightened or components (seals/hoses) replaced. In cases of doubt, contact KROHSE GmbH.

Table 6: Function tests before commissioning

For safety reasons, you must follow the procedure below precisely when commissioning your flaring device:

During work on live gas lines, there is a risk of fire and explosion.

► Operation of the flaring device with natural gas flowing out is permitted only if full personal protective equipment is being worn (flame- and heat-resistant protective clothing including head protection, safety goggles and gloves).

8.2 Without Venturi nozzle (STANDARD)

The procedure below describes the commissioning process for the two flaring device variants ECO-**STANDARD** and PREMIUM-**STANDARD**.

8.2.1 Igniting the secondary flame

Open the valve on the propane gas cylinder. Set the pressure reducer to the minimum working pressure.

Fully anti-clockwise!

Then fully open the valve ① on the piezo burner and immediately press the igniter ② – repeatedly if necessary – until the flame on the burner is lit.

8.2.2 Opening the gas supply

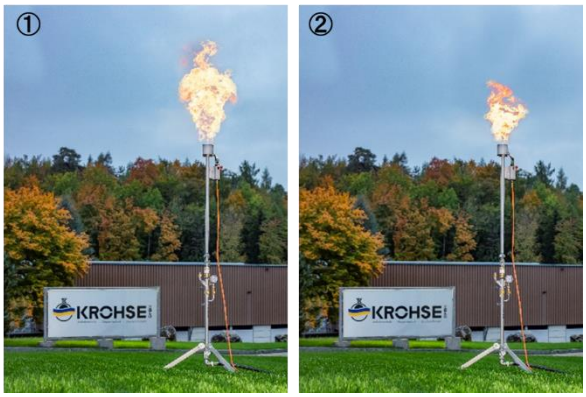
Open the shut-off valve on the natural gas line and then the main shut-off valve on the flaring device.

WARNING

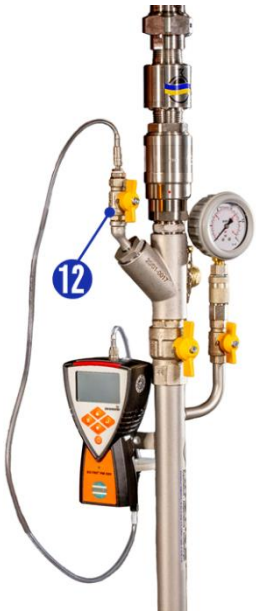
Make sure that the flame on the diffuser does increase in size but propagates as vertically as possible so as not to pose a hazard.

8.2.3 End of the flaring process

Towards the end of the flaring process, there is a clear decline in gas pressure at the pressure gauge and the flame diminishes (image ②).



It is advisable to carry out a gas concentration measurement using the connected gas detector. To do this, connect the gas detector to the test port ⑫ using the supplied adapters and open the valve on the test port to carry out the concentration measurement.



ATTENTION: The gas concentration measurement must be carried out only when the gauge pressure in the gas line is near zero. In addition, the gas concentration measurement must not be carried out when the Venturi nozzle is active (valve on the compressed-air connection closed).

An overview of the volumetric gas flow rate [m³/h] at different gas pressures can be found in Figure 4: on page 8.

8.2.4 Shutting down the flaring device

Close the shut-off valve on the propane gas cylinder. This allows the residual propane gas to dissipate towards the burner. Now fully close the valve ① on the piezo burner.

Remove the gas detector from the test port.

Open all valves on the main valve unit to release the trace amounts of residual gas.

8.3 With Venturi nozzle (PRO)

The procedure below describes the commissioning process for the two flaring device variants ECO-**PRO** and PREMIUM-**PRO**. Thanks to the integrated Venturi nozzle, these variants are suitable for the complete “evacuation” of a line, e.g. for complete **degassing** in the event of line decommissioning or to remove all gas from an isolated line section before separation takes place.

8.3.1 Igniting the secondary flame

Open the valve on the propane gas cylinder. Set the pressure reducer to the minimum working pressure.

Fully anti-clockwise!

Then fully open valve ① on the piezo burner and immediately press the igniter ② – repeatedly if necessary – until the flame on the burner is lit.

8.3.2 Opening the natural gas supply

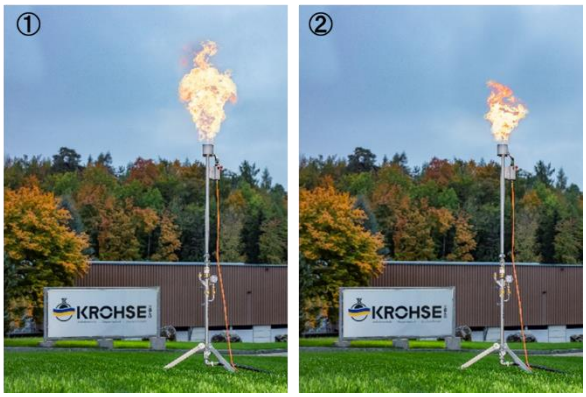
Open the shut-off valve on the natural gas line and then the main shut-off valve on the flaring device.

WARNING

Make sure that the flame on the diffuser does increase in size but propagates as vertically as possible so as not to pose a hazard.

8.3.3 End of the flaring process

Towards the end of the flaring process, there is a clear decline in gas pressure at the pressure gauge and the flame diminishes (image ②).



It is advisable to carry out a gas concentration measurement using the connected gas detector. To do this, connect the gas detector to the test port ⑫ using the supplied adapters and open the valve on the test port to carry out the concentration measurement.

ATTENTION: The gas concentration measurement must be carried out only when the gauge pressure in the gas line is near zero. In addition, the gas concentration measurement must not be carried out when the Venturi nozzle is active (valve on the compressed-air connection closed).

An overview of the volumetric gas flow rate [m³/h] at different gas pressures can be found in Figure 4: on page 8.

8.3.4 Evacuating the line

To extract the residual volume of gas in the line, the Venturi effect is used: Compressed air flowing out generates a negative pressure in the line.

At the Venturi nozzle ⓮, oil-free compressed air is inerted by the compressed-air connection ⓯.

Use only construction air compressors that allow oil-free preparation of compressed air and are able to limit the outlet pressure to 12 bar.

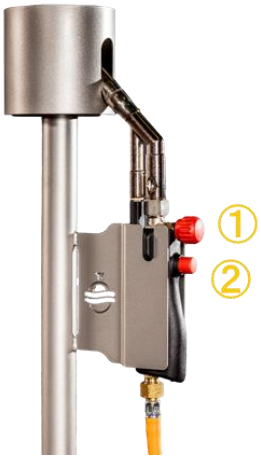
Make sure that the natural gas line can vent itself during the evacuation process. To do this, when you switch on the compressed air, simultaneously open a vent valve located on the other end of the gas line facing away from the flaring device.

When the primary flame goes out, stop the supply of compressed air by closing the valve on the compressed-air connection.

Now measure the gas concentration. If the measured value is 50% below the explosive limit concentration, you can proceed with shutting down the flaring device (8.3.5). If this concentration has not yet been reached, continue to evacuate the line (in accordance with 8.3.4)

8.3.5 Shutting down the flaring device

Close the shut-off valve on the propane gas cylinder. This allows the residual propane gas to dissipate towards the burner. Now fully close the valve ① on the piezo burner.

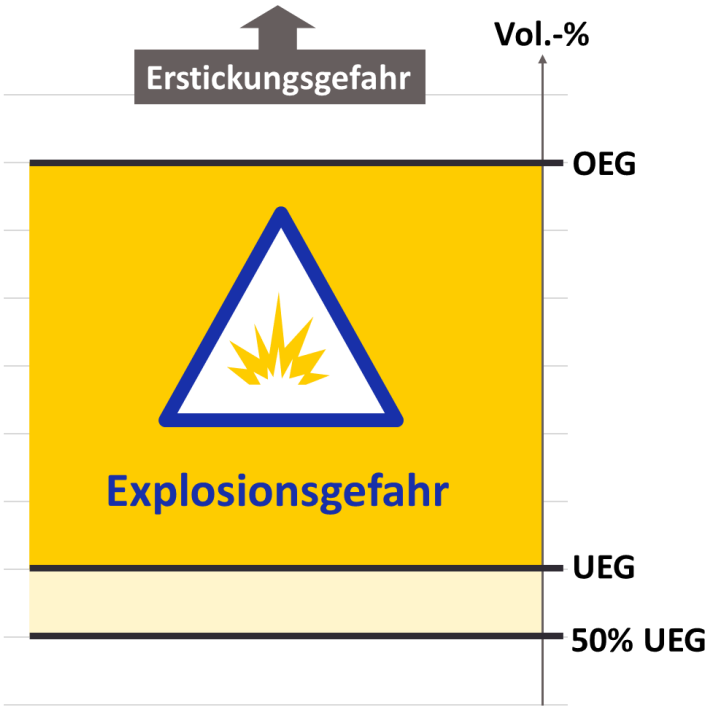


Remove the gas detector from the test port.

Open all valves on the main valve unit to release the trace amounts of residual gas.

8.4 Explosive concentrations

During work with flammable gases, knowledge of the explosive concentration limits is vital:



Gas concentrations as volume percentage [vol. %]

Gas	Danger limit > 50% of the LEL	LEL Lower explosion limit	UEL Upper explosion limit
Natural gas	**2%**	**4%**	**17%**
Propane	**0.8%**	**1.7%**	**12%**
Butane	**0.7%**	**1.5%**	**9%**
Acetylene	**0.7%**	**1.5%**	**82%**
Hydrogen	**2%**	**4%**	**76%**
Petrol	**0.3%**	**0.6%**	**8%**

Table 7: Gas concentrations

9 Disassembling the flaring device

9.1 Tools for disassembly

All connections required for disassembling the flaring device can be loosened either by hand or with the supplied assembly spanners.

9.2 Disassembly and removal

9.2.1 Disconnecting the pressure gauge

Pull the locking sleeve on the pressure gauge connection ⓭ down slightly to make it possible to remove the pressure gauge ⓲.

With the connection facing upwards, return the pressure gauge ⓲ to the designated stowage compartment in the transport trolley.

9.2.2 Removing the piezo burner

Check that the shut-off valve on the gas cylinder is fully closed. Loosen the **left-hand** thread of the pressure reducer connection (at the opposite end of the orange propane gas hose) from the propane gas cylinder.

Slide the piezo burner upwards until it comes free from the bracket (step ①). Then swivel the burner nozzle out of the opening in the diffuser (step ②).

Return the cooled piezo burner set ⓽ to the designated compartment in the transport trolley.

ATTENTION: The piezo burner set must not be stowed in the transport trolley until it has fully cooled.
→ Fire hazard!

9.2.3 Removing the degassing hose

Make sure that the shut-off valve on the natural gas line is closed. Remove both ends of the degassing hose ⑥ (from the elbow of the lower riser on the flaring device) and from the other end together with the connection adapter ⑧ (on the natural gas line/inflatable stopper installer).

Roll up the degassing hose and bind it using the strap supplied.

9.2.4 Removing the upper riser

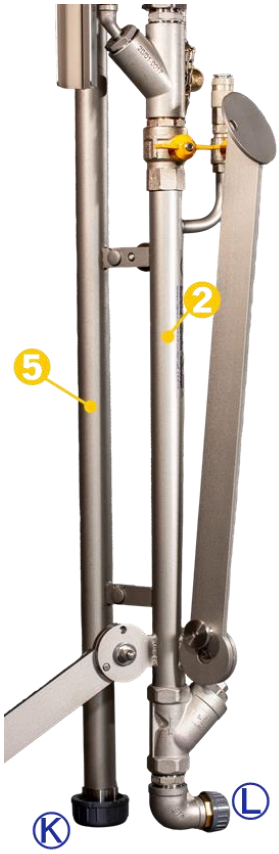
Now loosen the union nut at the connection point Ⓥ using the two assembly spanners ⑯ and ⑰, and remove the upper riser ⑤.

Take care not to lose, damage or contaminate flat seal ⑲ on the lower connection point.

Remove the sound suppressor from the upper riser in the diffuser using the assembly spanner. If required, clean the sound suppressor.

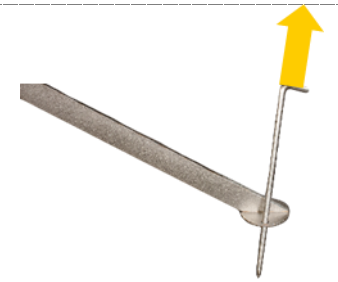
Attach the upper riser ⑤ to the brackets of the lower riser unit Ⓐ. To do this, pull the upper locking pin back and then re-engage it to ensure that the upper riser is securely locked in place.

Now take all three grey PVC protective caps/plugs (Ⓙ, Ⓚ and Ⓛ) from the transport trolley and screw them into place.



9.2.5 Pulling the ground pegs

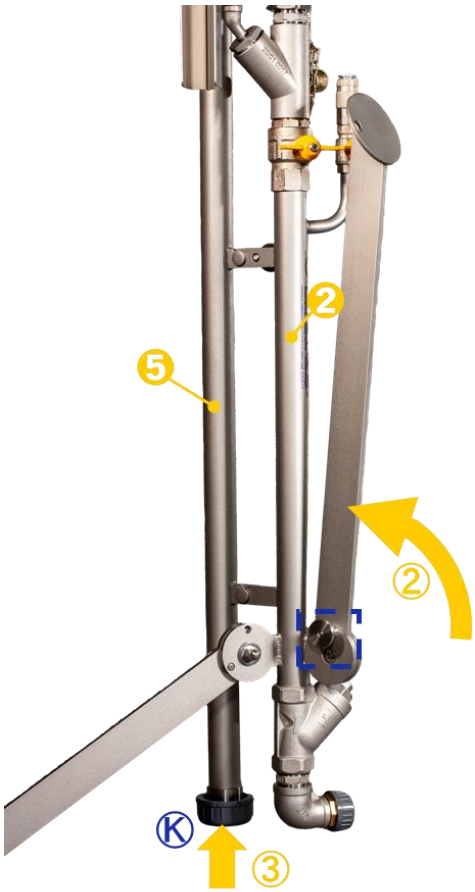
Remove the earthing cable ⑳ and pull the ground pegs ④ out of the ground. Clean the ground pegs using a damp cloth and return them to the designated compartment in the transport trolley.



9.2.6 Dismantling the lower riser module

Loosen the locking pins (step ①) and fold all three feet upwards (step ②) until you hear the sprung locking pins and the feet are locked in the uppermost position.

In the process, stand the riser unit Ⓐ = ② + ⑤ carefully on the grey PVC protective cap Ⓚ that seals the upper riser (step ③).



Make sure that the upper riser is securely attached in the bracket and locked in place by the locking pins.

Finally, place the riser unit Ⓐ (with upper riser attached) in the transport trolley ❶ with the upper riser facing downwards and the two feet facing upwards.

Note: The “KROHSE label” faces upwards.

10 Troubleshooting

A fault or malfunction can often be easily rectified by some simple remedial measures.

10.1 Fault causes and remedial measures

Fault cause	Description ► Remedial measure
Flame flickers significantly	Strong wind ► Find shelter from the wind or carry out the work in better weather conditions Not enough propane gas in the cylinder ► Replace the propane gas cylinder
Pressure does not drop to zero towards the end	Gas line shut-off not 100% leak-tight ► Make sure that the shut-off valve is fully closed or improve the effectiveness of the inflatable stoppers (use stoppers for higher pressures or double stoppers).
Valves leaking or stiff to move	Shut-off valve no longer functioning ► If the shut-off valves cannot be fully opened or closed correctly, the affected components on the flaring device must be replace after consultation with KROHSE GmbH.
Connection point stiff to move or leaking	External thread damaged (impact damage) ► Rework the thread after consultation with KROHSE GmbH External thread fouled ► Clean the thread and then lubricate with silicone spray Seal damaged/no seal fitted ► Check and fit a new flat seal
Foot does not engage	Locking pin not engaging (deformation of the foot) ► Rework the bore hole slightly using a file ► Replace the foot
Sliding sleeve on the pressure gauge connection does not move	Coupler operated without pressure gauge ► Pull the locking sleeve back and refit the pressure gauge ► Lubricate the locking sleeve with silicone spray
Piezo burner not igniting	Not enough propane gas in the cylinder ► Replace the propane gas cylinder Ignition mechanism defective ► Replace the piezo burner Pressure reducer defective ► Replace the pressure reducer

Table 8: Fault causes and remedial measures

10.2 Technical support

Technical support for the flaring device

Watch our detailed video guide at
www.YouTube.com Search term: “**Abfackelgerät KROHSE**”

+41 (0) 52 202 10 51

info@krohse.ch

11 Storage and transport

To ensure that your flaring device is always protected from dust, dirt, moisture and damage, always keep the device safely stored in the carry case when out of use.
If it is necessary to carry the flaring device inside the transport trolley (30 kg), this should be done by two persons holding the side carry handles to avoid overexertion. If only one person is available, the transport trolley and riser unit can be carried separately.

12 Maintenance and repair

12.1 Cleaning and care

Clean your flaring device with silicone spray after it has cooled. Never use corrosive or abrasive products as this could damage the anti-corrosion protection and seals.

12.2 Maintenance

Check after use: After each use, it is necessary to inspect the KROHSE flaring device for sound condition and cleanliness of components.
Table 9 below provides an overview of the components on your flaring device that require regular maintenance:

Component	Maintenance and frequency	Maintenance level	Carried out by
Compressed-air connection on the Venturi nozzle	Regular maintenance after each use • Check the seal, shut-off valves and hose • Lubricate the safety clutch with silicone spray for good ease of movement	**L1**	User
Degassing hose set	Regular maintenance after each use • Check the O-rings	**L1**	User
Piezo burner set	Regular maintenance after each use • Check that the components are in a sound condition (cracks in the hose, impact damage to the burner and pressure reducer, etc.)	**L1**	User
Pressure gauge, pressure gauge coupler	Regular maintenance after every 3rd use • Check that the connections are clean and undamaged • Lubricate with silicone spray	**L1**	User
Prefilter	Regular maintenance after every 3rd use • Filter cap removal • Remove the screen and blow out with compressed air • Fit the screen and fasten the filter cap firmly (PTFE seal must be present on the cap)	**L1**	User
Sound suppressor	Check regularly and, if necessary, clean with compressed air	**L1**	User

Table 9: Maintenance level 1

Component	Maintenance and frequency	Maintenance level	Carried out by
Complete flaring device	Annual maintenance • Leak test of the entire unit including pressure gauges and degassing hoses • Accuracy test of the pressure gauges • Clean all fitted filters (prefilter, main filter in the flame flashback/gas backflow arrester) • Function test of the piezo burner set	**L2**	KROHSE GmbH or service partner

Table 10: Maintenance level 2

Maintenance level

L1: Carried out by the user of the flaring device.

L2: Must be carried out by a technician at KROHSE GmbH **or one of its service partners**.

It is prohibited for a level 2 maintenance service to be carried out by the user or by another technician not appointed by KROHSE GmbH or its service partners. This would result in instant invalidation of the guarantee and a release of liability.

Tampering with or modification to components of the device result in instant invalidation of the guarantee and a release of liability.

For the annual maintenance (L2) or repair of your KROHSE flaring device, please send the complete device including all components and accessories inside the transport trolley to the manufacturer KROHSE GmbH or one of its service partners.

12.3 Wear of components

The wear life of the degassing hose and propane gas hose is 8 (eight) years.

External factors (temperature, UV light, media contact, heavy mechanical loading, etc.) could lead to premature embrittlement of the hoses. For this reason, check these components regularly.

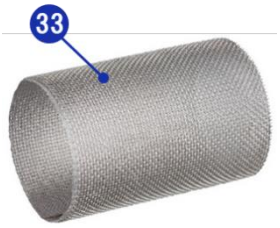
12.4 Cleaning/replacing the prefilter

Clean the prefilter after every 3rd use of your flaring device.

To do this, loosen the filter cap 31 on the lower riser module 2 using a WAF 30 mm open-ended spanner and unscrew it completely.

When you are unscrewing or screwing on the filter cap 31 , take care not to lose, damage or contaminate the white PTFE seal 32 . This must be exchanged if necessary.

Remove the prefilter screen 33 , check it for damage and clean it with compressed air.



Make sure that you fit the prefilter screen 33 in the correct position. Now screw the filter cap 31 onto the lower riser module 2 and retighten it to approximately 30 Nm, ensuring a gas-tight seal.

Check the condition of the sound suppressor regularly and cle21 it with compressed air.

13 Accessories

The following replacement parts and accessories are available.

	Component	Item no.	Specification
1	Transport trolley	9050000	HPX
3	Foot	1420010	Stainless steel 1.4301
4	Ground peg Ground peg with cable socket	1420005 1420045	Stainless steel 1.4301 Stainless steel 1.4301
6	Degassing hose set	8050090	GWPB DN 19 x 4.5 mm for propane/ natural gas, PN 20, ISO 3821 (free choice of length) with brass coupler at both ends (female taper G1" ET)
7	Coupler for degassing hose 1" ET x 1" ET	1460085	Brass, both ends Female taper with G1" ET
8	Connection adapter • 2 ½" ET • ¾" ET	 1460040 7370232	Brass
9	Piezo burner	5520051 5528012 5526001	Piezo burner, LH ⅜" Propane gas hose 4 m, LH ⅜" Pressure reducer 1.5 to 4 bar, internal thread 21.7 x 1.814 G
12	Blanking plug on the test port	1450000	PVC, ¼" ET
16	Hook spanner, 60–90	7370114	Phosphated steel with joint
17	Single open-ended spanner, 36 mm	9070036	Phosphated steel
18	Pressure gauge -1—1.5 bar Pressure gauge -1—5 bar Pressure gauge protective cap	1020000 1020005 8050040	63 mm diameter, Cl. 1.6, glycerin-filled 63 mm diameter, Cl. 1.6, glycerin-filled Rubber, grey
19	Flat seal 44 x 33 x 2 mm	8050050	NBR 70 Shore A
20	Earthing cable	1450035	90 cm, connector on both ends, 25 mm²
21	Sound suppressor G 1" ET WAF 36	1420055	Stainless steel 1.4301
22	Assembly spanner (sound suppressor)	1420070	Stainless steel 1.4301
J	PVC plug at top of lower riser module	1450010	PVC, 1½" ET
K	PVC cap at the bottom of the upper riser	1450015	PVC, 1½" IT
L	PVC cap at the bottom of the elbow on the lower riser module	1450005	PVC, 1" IT
	Strap for the degassing hose set	8050020 8050025 8050030 8050035	Hose length 10 m Hose length 20 m Hose length 30 m Hose length 40 m
31	Filter cap		Stainless steel 1.4301
32	PTFE seal	1450020	PTFE, 42.8 diameter x 40.3 diameter x 1.4 mm
33	Prefilter screen	1430025	Stainless steel 1.4301

Table 11: Replacement parts and accessories

14 Disposal

The flaring device can be taken to a conventional disposal point offering environmentally responsible recycling of metals, plastics and special waste.

These operating instructions were conceived, designed and created by Marketing4P.

15 Appendix

15.1 Data sheet: Flame flashback/gas backflow arrester

Sicherheitseinrichtung

IBEDA SOLUTIONS FOR GASES

Die Sicherheitseinrichtung (Gasrücktrittsicherung) GRS25:

Modell GRS25 zum Absichern von Ringleitungen, Entnahmestellen und Verbrauchern

Sicherheitseinrichtung GRS25:

- vermeidet gefährliche Gasgemischbildung durch ein Gasrücktrittventil (NV)
- verhindert Flammendurchschlag bei Druckluft als Oxydant
- ein Schmutzfilter schützt das Gasrücktrittventil vor Verschmutzung
- jede Sicherheitseinrichtung ist 100% überprüft
- alle metallischen Bauteile sind aus Messing 2.0401 / Feder 1.4310

Sicherheitselemente der IBEDA Gasrücktrittsicherung GRS25:

- NV Gasrücktrittventil

Zusätzliches Funktionselement:

- DF Schmutzfilter

DG-4390CQ0051

Für weitere Informationen: http://www.ibeda.com/de/gasruecktrittsicherungen

Wartung:

Die Sicherheitseinrichtungen sind in bestimmten Zeitintervallen durch eine geschulte und autorisierte Person nach landesspezifischen Vorschriften zu prüfen. Mindestens einmal jährlich muss die Sicherheitseinrichtung auf Dichtheit und Sicherheit gegen Gasrücktritt geprüft werden (entsprechend TRBS 1201, Tabelle 2 - „bewährte Prüffristen für wiederkehrende Prüfungen").

Die Sicherheitseinrichtungen dürfen nicht geöffnet werden.

Der Schmutzfilter kann nur bei den Anschlussgröße G1RH F/Fund 1NPT F/F, durch eine autorisierte und befähigte Person ausgewechselt werden.

Technische Daten:

Gasrücktrittsicherung GRS nach DIN EN ISO 5175-2: Flammendurchschlagsicher bei Betrieb mit Druckluft

Gasarten:	Stadt- und Ferngas (C)	Wasserstoff (H)	Erdgas (Methan) (M)	Propan (P)	Biogas gereinigt (M)
Betriebsdrücke:	0,15 MPa 1,5 bar		0,5 MPa 5 bar		0,5 MPa 5 bar
Öffnungsdruck:	4 bis 6 mbar lageunabhängig				
Medientemperatur:	-20°C bis +70°C (Sauerstoff -20°C bis +50°C)				
Umgebungs-temperatur:	-20°C bis +70°C				
Gewindeanschlüsse: DIN ISO 228	G1RH F/F[3)] G3/4RH F/F[3)] G1/2RH F/F[3)] 1NPT F/F[3)] 3/4NPT F/F[3)] 1/2NPT F/F[3)]				

Maße und Gewicht:	Durchmesser:	Länge:	Gewicht:
G1 - 1NPT:	55 mm	108 mm	1,1 kg
G3/4 - 3/4NPT:	55 mm	121 mm	1,2 kg
G1/2 - 1/2NPT:	55 mm	103 mm	1,1 kg

Verwendung:	Wärmbrenner, Gasmisch- und Regeltechnik und Industrielle Thermoprozessanlagen nach EN 746-2

Andere Werkstoffe, Oberflächenveredelungen, Gasarten und Gewindeanschlüsse oder -kombinationen auf Anfrage.
[3)] F = Innengewinde, M = Außengewinde

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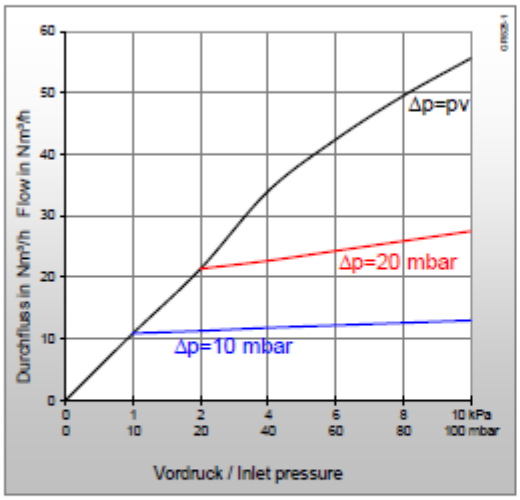
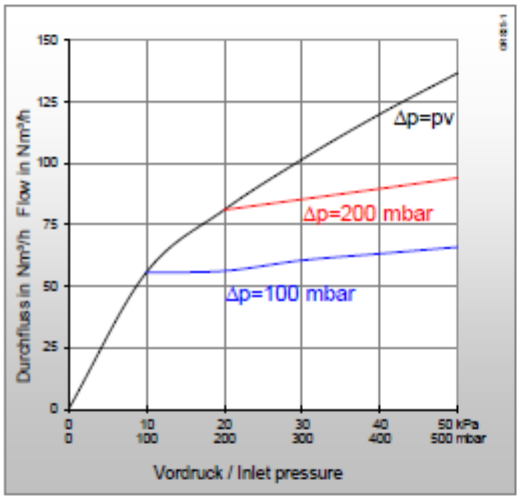
ZERTIFIZIERTE SICHERHEIT – WELTWEIT!

DE/03/18/00

Sicherheitseinrichtung

IBEDA SOLUTIONS FOR GASES





Beispiel Durchflusskurve Modell: GRS25 G1RH F/F.
Werte für andere Anschlüsse auf Anfrage.

Modell: **GRS25**

Durchflussdaten [Luft]:

pv = Vordruck
ph = Hinterdruck
Δp = Vordruck minus Hinterdruck

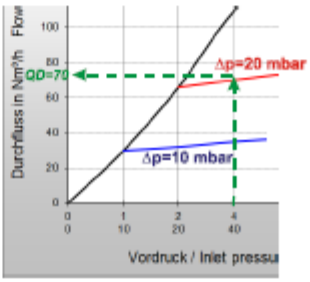
Umrechnungsfaktor:

10 kPa = 100 mbar = 0,01 MPa = 0,1 bar = 1,45 psi
1 m^3/h = 35,31 cu ft/h

	H	P	L	M	M	O
QG ▶	H_2	C_3H_8	C_3H_6	CH_4+C	CH_4	O_2
F	3,8*	0,90	0,92	1,25	1,4	0,95

* Umrechnungsfaktor 2,5 beim Ausströmen über eine Flammensperre.
Beim Ausströmen aus einer Öffnung beträgt der Faktor 3,8.
(Quelle: BAM Forschungsbericht 220, D. Lietze)

Beispiel:



QG = QD x F
QG ▶ P = 70 x 0,9 = 63 m^3/h C_3H_8
QG = Durchfluss / Gasart
F = Umrechnungsfaktor
QD = Durchfluss / Luft

Herstellererklärung

Wir erklären als Hersteller, dass die Sicherheitseinrichtungen die Anforderungen der aufgeführten Richtlinien und Normen erfüllen:

Richtlinie: 2014/68/EU Druckgeräterichtlinie

Normen: DIN EN ISO 5175 Teil 2

Gemäß Druckgeräterichtlinie 2014/68/EU gilt für druckhaltende Ausrüstungsteile mit DN ≤ 25 mm für Gase der Gruppe 1 und Gruppe 2 für das in Verkehr bringen Artikel 4 Abs. 3; Artikel 5 Abs.1 (gute Ingenieurspraxis).

Der Hersteller darf für solche Geräte im Zusammenhang mit der Druckgeräterichtlinie weder eine EG-Konformitätserklärung abgeben noch eine CE-Kennzeichnung anbringen.

(siehe Auszug: Leitlinie zur Richtlinie 2014/68/EU).

Zulassungen / Technische Regeln / Richtlinien

BAM Bundesanstalt für Materialforschung und-prüfung,
DVGW Deutsche Vereinigung des Gas- und Wasserfaches e.V.,
DVS Deutscher Verband für Schweissen und verwandte Verfahren e.V., DGUV Deutsche Gesetzliche Unfallversicherung Vorschriften und Regeln, TRBS Technische Regeln für Betriebssicherheit.

Normen/ Baubestimmungen

Unternehmen zertifiziert nach
ISO 9001:2015 und ISO 14001:2015,
CE-Kennzeichnung gemäß: Druckgeräterichtlinie 2014/68/EU

(Änderungen vorbehalten)

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ZERTIFIZIERTE SICHERHEIT – WELTWEIT!

DE/03/1 8/00

15.2 DVGW certificate: Valves

Art. IK1116xx und IK1119xx

DVGW CERT

DIN-DVGW-Baumusterprüfzertifikat

DIN-DVGW type examination certificate

NG-4312BN0021
Registriernummer
registration number

Anwendungsbereich *field of application*	Produkte der Gasversorgung *products of gas supply*
Zertifikatinhaber *owner of certificate*	
Vertreiber *distributor*	
Produktart *product category*	Gasarmaturen: Absperrarmatur <= MOP 5 (4312)
Produktbezeichnung *product description*	Kugelhahn für die Gasinstallation
Modell *model*	LONDON; 060
Prüfberichte *test reports*	Baumusterprüfung: 11/272/4312/132 vom 02.08.2012 (EBI)
Prüfgrundlagen *test basis*	DIN EN 331 (01.08.2011)
Ablaufdatum / AZ *date of expiry / file no.*	28.01.2017 / 11-0761-GNV

02.10.2012 Rie A-1/2
Datum, Bearbeiter, Blatt, Leiter der Zertifizierungsstelle
date, issued by, sheet, head of certification body

DVGW CERT GmbH ist von der DAkkS nach DIN EN 45011:1998 akkreditierte Stelle für die Zertifizierung von Produkten der Energie- und Wasserversorgung.

DVGW CERT GmbH is an accredited body by DAkkS according to EN 45011:1998 for certification of products for energy and water supply industry.

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Deutsche Akkreditierungsstelle
D-ZE-16028-01-01

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A-2/2 NG-4312BN0021

Gasart *gas category*	Bemerkungen *remarks*
Brenngase nach G260	

Typ *type*	Technische Daten *technical data*	Bemerkungen *remarks*
066/067/068/069/266/267	Druckklasse: MOP 5/ GT 0,1 Nennweite: DN 8	
066/067/068/069/266/267	Druckklasse: MOP 5/ GT 0,1 Nennweite: DN 10	
060/066/067/068/069/266/267	Druckklasse: MOP 5/ GT 0,1 Nennweite: DN 15	
066/067/068/069/266/267	Druckklasse: MOP 5/ GT 0,1 Nennweite: DN 20	
066/067/068/069/266/267	Druckklasse: MOP 5/ GT 0,1 Nennweite: DN 25	
066/067/266/267	Druckklasse: MOP 5/ GT 0,1 Nennweite: DN 32	
066/067/266/267	Druckklasse: MOP 5/ GT 0,1 Nennweite: DN 40	
066/067/266/267	Druckklasse: MOP 5/ GT 0,1 Nennweite: DN 50	

Ausführungsvariante *type variation*	Erläuterungen *explanations*
066/067/068/069	Durchgangsform (Baureihe LONDON)
060	Eckform; Anschlussart: beiderseitig Außengewinde R 1/2 nach DIN EN 10226-1, Betätigungsorgan: Flügelgriff aus Aluminium
066	Anschlussart: beiderseitig Innengewinde Rp 1/4 bis Rp 2 nach DIN EN 10226-1; Betätigungsorgan: Handhebel aus Stahl
067	Anschlussart: einerseits Innengewinde Rp 1/4 bis Rp 2, andererseits Außengewinde R 1/4 bis R 2, jeweils nach DIN EN 10226-1; Betätigungsorgan: Handhebel aus Stahl
068	Anschlussart: beiderseitig Innengewinde Rp 1/4 bis Rp 1 nach DIN EN 10226-1; Betätigungsorgan: Flügelgriff aus Aluminium
069	Anschlussart: einerseits Innengewinde Rp 1/4 bis Rp 1, andererseits Außengewinde R 1/2 bis R 1, jeweils nach DIN EN 10226-1; Betätigungsorgan: Flügelgriff aus Aluminium
266	wie 066, jedoch mit flachem Handhebel
267	wie 067, jedoch mit flachem Handhebel

zertifizierte Bauteile / Werkstoffe
certified components

Registr.-Nr. *registration no.*	Bauteil (Produktart) *component*	Modell/Typ *model/type*	Hersteller *manufacturer*
NG-5112AR0799	Dichtungswerkstoff aus Elastomeren für Gasgeräte und -anlagen	0170 NBR 70/0170 NBR 70	AR-TEX S.p.A.
NG-5146AR0617	Dichtmittel für herstellerseitig zusammengefügte Gewindeverbindungen in Gasgeräten und Komponenten	LOCTITE 2701/LOCTITE 2701	Henkel AG & Co. KGaA
DG-5112AS0532	Dichtungswerkstoff aus Elastomeren für Gasgeräte und -anlagen	FP 70 (3170) GREEN/FP 70 (3170)	AR-TEX S.p.A.

Verwendungshinweise / Bemerkungen
hints of utilization / remarks

Umgebungstemperaturbereich: -20...+60 °C
Thermische Belastbarkeit (geprüft nach DIN EN 1775, Oktober 2007): +650° C für Betriebsdrücke bis 100 mbar (GT 0,1)

16 Usage record

In the table below, you can document your experiences of using the flaring device.

No.	Date/ name	Location	Operating pressure	Medium	Venturi nozzle [yes/no]	Line parameters [diameter, length]	Flaring duration

Table 12: Replacement parts and accessories