OPERATING INSTRUCTIONS

EN

Translation of the original instructions

KLF 025/040/063

Cooling Trap

PFEIFFER VACUUM

PD0015BEN/D (1606)

Table of contents

1 About this manual

1.1 Validity

This operating manual is for customers of Pfeiffer Vacuum. It describes the functioning of the designated product and provides the most important information for safe use of the unit. The description follows applicable EU guidelines. All information provided in this operating manual refers to the current state of the product's development. The documentation remains valid as long as the customer does not make any changes to the product.

Up-to-date operating instructions can also be downloaded from www.pfeiffer-vacuum.com.

1.2 Conventions

Safety instructions

The safety instructions in Pfeiffer Vacuum operating instructions are the result of risk evaluations and hazard analyses and are oriented on international certification standards as specified by UL, CSA, ANSI Z-535, SEMI S1, ISO 3864 and DIN 4844. In this document, the following hazard levels and information are considered:

DANGER
Imminent danger Indicates an imminent hazardous situation that will result in death or serious injury.

WARNING
Possibly imminent danger Indicates an imminent hazardous situation that can result in death or serious injury.

CAUTION
Possibly imminent danger Indicates an imminent hazardous situation that can result in minor or moderate injury.

NOTICE
Command or note Command to perform an action or information about properties, the disregarding of which may result in damage to the product.

Pictographs

Prohibition of an action to avoid any risk of accidents, the disregarding of which may result in serious accidents

Warning of a displayed source of danger in connection with operation of the unit or equipment

Command to perform an action or task associated with a source of danger, the disregarding of which may result in serious accidents

Important information about the product or this document

Instructions in the text

➔ Work instruction: here you have to do something.

Abbreviations

KLF: Cooling Trap

2 Safety

2.1 Safety precautions

Duty to inform

Each person involved in the installation or operation of the unit must read and observe the safety-related parts of these operating instuctions.

➔ The operator is obligated to make operating personnel aware of dangers originating from the unit or the entire system.

➔ Observe the safety and accident prevention regulations.

➔ Check regularly that all safety precautions are being complied with.

➔ When returning the components to us please note the instructions in the Service section.

2.2 Protective equipment

Determined situations concerning the handling of vacuum pumps require wearing of personal protective equipment. The owner, respectively the employer are obligated to provide an adequate equipment to any operating persons.

DANGER

Danger to health by hazardous substances during maintenance or installation

Depending on the process vacuum pumps, components or operating fluids can be contaminated by toxic, reactive or radioactive substances.

➔ Wear adequate protective equipment during maintenance and repairs or in case of reinstallation.

DANGER

Frostbite, severe eye damage and suffocation hazard!

Contact with coolant causes frostbite and severe eye damage. Liquid coolants, in particular, have the tendency to spray explosively when filled too quickly or when the cooling container is warm. Coolant passing into a gaseous state can, in high concentrations, displace oxygen and lead to suffocation hazard by accumulating in the inhaled air.

➔ Wear safety glasses with adequate side protection; wear protective gloves (special cryo-gloves or leather gloves).

➔ Secure liquid gas tanks from falling over, and protect them against shock, impact and heat; ventilate rooms adequately.

2.3 Proper use

- Only use cold traps on the intake side of vacuum pumps for separation of condensate.
- Always install cold traps vertically to maintain the required "top-down" through-flow direction.
- Select the nature of the coolant according to the particular process medium and process pressure before filling with coolant.
- Installation, operating and maintenance regulations must be complied with.
- Other accessories, than those described in this manual, must not be used without the agreement of Pfeiffer Vacuum.

2.4 Improper use

Improper use will cause all claims for liability and warranties to be forfeited. Improper use is defined as usage for purposes deviating from those mentioned above, especially:

- pumping of explosive media
- operation in potentially explosive areas
- pumping of substances that tend to sublime
- pumping of liquids
- Pumping of gases containing impurities such as particles and dusts
- connection to pumps or units which are not suitable for this purpose according to their operating instructions
- use of accessories or spare parts, which are not named in this manual
- connection to units which have exposed voltage-carrying parts
- operation of the devices in areas with ionizing radiation

3 Transport and storage

3.1 Storage

➔ Close the flange openings by using the original protective covers.

➔ Store the unit in a cool, dry place; preferably at temperatures between +5 °C and +40 °C

– For a longer period of storage, seal the pump in a PE bag with drying agents enclosed.

4 Product description

4.1 Product identification

To correctly identify the product when communicating with Pfeiffer Vacuum, always have the information from the rating plate available.

- Model and model number
- Date of manufacture

Fig. 1: Product identification on the rating plate

Scope of delivery

- KLF 025/040/063 without coolant filling
- Locking cap for the flanges

Variants

Type	Versions
Cooling Trap KLF 025	with flange DN 25 ISO-KF
Cooling Trap KLF 040	with flange DN 40 ISO-KF
Cooling Trap KLF 063	with flange DN 63 ISO-K

4.2 Function

The cold trap provides an effective protection for vacuum pumps when pumping aggressive media, as these substances can be condensed out by using the appropriate coolant. It is always installed between the recipient and the pump in the intake line. Especially with rotary vane pumps, the cold trap prevents the back-flow of hydrocarbons into the recipient by means of condensation. All cold trap parts are made of stainless steel. Both connections are designed for quick connection to small or clamping flanges.

DN 1: Gaseintritt (Rezipient)
DN 2: Gasaustritt (Anschluss Vakuumpumpe)

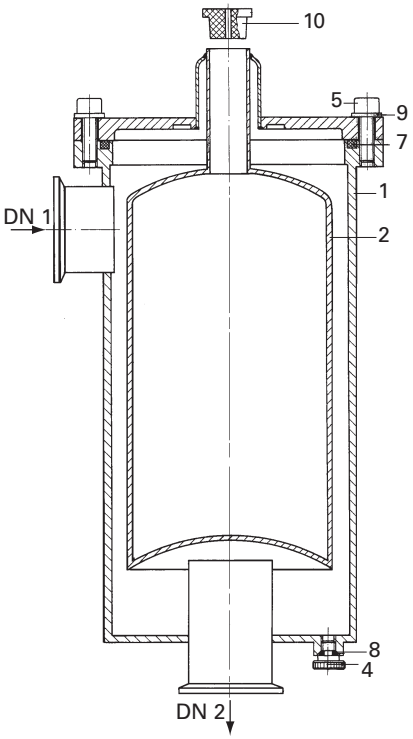
Fig. 2: KLF 040/063

The cooling trap can be filled with various coolants to condense or freeze the process media. The particular coolant must be selected depending on the dew point of the process medium and taking into account the intake pressure of the vacuum pump.

5 Installation

5.1 Assembling

➔ Install the cold trap into the system vertically;
– make sure, when installing, that sufficient space is available for filling with coolant.



DN 1 Connection: recipient
DN 2 Connection: vacuum pump
1 Housing
2 Coolant container
4 Condensate drain screw
5 Cylinder head screw
7 O-ring
8 O-ring
9 Cup spring
10 Plug

Fig. 3: KLF 040/063

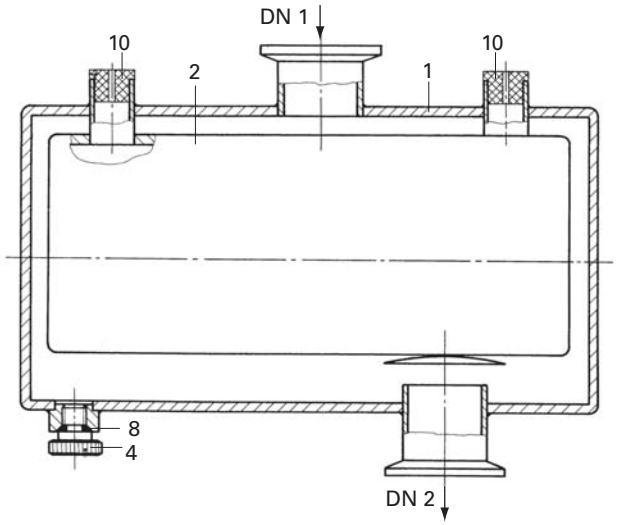


Fig. 4: KLF 025

DN 1 Connection recipient
DN 2 Connection vacuum pump
1 Housing
2 Coolant container
4 Condensate drain screw
8 O-ring
10 Plug

5.2 Filling in the coolant

DANGER

Frostbite, severe eye damage and suffocation hazard!

Contact with coolant causes frostbite and severe eye damage. Liquid coolants, in particular, have the tendency to spray explosively when filled too quickly or when the cooling container is warm. Coolant passing into a gaseous state can, in high concentrations, displace oxygen and lead to suffocation hazard by accumulating in the inhaled air.

➔ Wear safety glasses with adequate side protection; wear protective gloves (special cryo-gloves or leather gloves).

➔ Secure liquid gas tanks from falling over, and protect them against shock, impact and heat; ventilate rooms adequately.

Possible coolant

The cold traps can be filled with the following coolants, depending on the dew point of the process medium and the field of application:

- Liquid air:- 192°C
- Liquid Nitrogen LN_2:- 196°C
- Dry ice CO_2:- 78°C

WARNING

when using coolants, the relevant safety data sheets for hazardous materials and any legislative provisions contained therein must be observed!

Liquid coolant

➔ Fill liquid coolant with **KLF 025** after removing the two plugs 10 (with **KLF 040/063** only one plug 10) into the coolant container 2;
  – use funnels, if needed, so that air can escape more easily from coolant container 2.

Dry ice (carbon dioxide)

➔ Likewise fill with dry ice as coolant, with **KLF 025** fill coolant into both pipe connections. For a better cooling effect, ethanol should be poured in along with the dry ice to provide better temperature transition.

6 Operation

CAUTION

Bad final vacuum and damage to the pump!

With decreasing cooling efficiency, process gases can pass into the pump and damage the pump interior. With regular cooling performance, the condensate level can exceed the holding capacity of the cold trap and condensate can flow into the pump.

➔ Top up with coolant in good time.

➔ Interrupt the process and drain the condensate in time, before the capacity of the cold trap is reached.

With decreasing cooling effect, the cold trap can be filled without interrupting the process. Since no visual filling level control is possible (no sight glass available), the coolant life or shortfall can be determined by temperature measurement, if needed. The maximum amount of condensate the cold trap can hold depends depends on whether the condensate is deposited in liquid or ice form. Condensate can be drained without interrupting operation by using two cold traps operated in alternation.

7 Maintenance

DANGER

Release of toxic materials

Danger to health through contact with toxic substances during operation, service and maintenance work.

➔ The operator must provide suitable protective clothing for all work on open chambers and vacuum components.

WARNING

Contamination of parts and operating fluid by pumped media is possible.

Poisoning hazard through contact with materials that damage health.

➔ In the case of contamination, carry out appropriate safety precautions in order to prevent danger to health through dangerous substances.

➔ Decontaminate affected parts before carrying out maintenance work.

7.1 Draining the condensate

The coolant consumption or coolant life is process dependent and must be determined for each case. Depending on the process gas and temperature of the cold trap, either condensation or ice can be formed within the housing. With decreasing cooling effect, the condensate may well evaporate and enter into the pump.

➔ Turn off the vacuum pump, vent to atmospheric pressure and allow to cool.

➔ Unscrew condensate drain plug and drain any accumulated condensate.

– In case the condensate was deposited at the casing surface in the form of ice, heat the cold trap and thaw the ice, if needed.

➔ Dispose of condensate according to the respectively valid legal requirements.

➔ Screw the condensate drain plug in again; pay attention to O-ring 8.

➔ Check coolant filling level; top up if necessary.

7.2 Dismantling the cooling trap

Cold traps KLF 063 or KLF 040 can be disassembled to clean the interior; the KLF 025 can not be opened.

KLF 040/063

➔ Remove screws 5, be careful with disc springs 9.

➔ Pull the top of cold trap KLF 040/063 along with coolant container 2 out of the housing perpendicularly; pay attention to O-ring 7.

➔ Clean all parts and inspect for wear.

➔ **Assembling** is carried out in reverse order.

➔ Insert new O-ring 7.

➔ Use screws 5, each with 2 cup springs 9 (same mounting orientation) and tighten the screws evenly.

8 Service

Pfeiffer Vacuum offers first-class service!

- Maintenance / repair in the nearby ServiceCenter or ServicePoint
- Fast replacement with exchange products in mint condition
- Advice on the most cost-efficient and quickest solution

Detailed information, addresses and forms at: **www.pfeiffer-vacuum.com (Service**).

Maintenance and repairs in the Pfeiffer Vacuum ServiceCenter

Für eine schnelle und reibungslose Abwicklung sind folgende Schritte notwendig:

➔ Download the forms "Service Request" and "Declaration on Contamination".[1)]

➔ Fill out the "Service Request" form and send it by fax or e-mail to your Pfeiffer Vacuum service address.

➔ Include the confirmation on the service request from Pfeiffer Vacuum with your shipment.

➔ Fill out the declaration on contamination and include it in the shipment (required!).

➔ Dismantle all accessories.

➔ Drain off condensate and dispose of in accordance with the relevant valid legal regulations.

➔ Drain off coolant, if present.

➔ If possible, send pump or unit in the original packaging.

Sending of contaminated pumps or devices

No units will be accepted if they are contaminated with micro-biological, explosive or radioactive substances. “Hazardous substances” are substances and compounds in accordance with the hazardous goods directive (current version). If pumps are contaminated or the declaration on contamination is missing, Pfeiffer Vacuum performs decontamination at the shipper's expense.

➔ Neutralise the pump by flushing it with nitrogen or dry air.

➔ Close all openings airtight.

➔ Seal the pump or unit in suitable protective film.

➔ Return the pump/unit only in a suitable and sturdy transport container and send it in while following applicable transport conditions.

Service orders

All service orders are carried out exclusively according to our repair conditions for vacuum units and components.

1) Forms under www.pfeiffer-vacuum.com

9 Decommissioning

9.1 Shutting down for longer periods

Follow the following procedure before shutting down the unit for a longer period of time:

➔ Turn off the vacuum pump, vent to atmospheric pressure and allow to cool.

➔ Unscrew condensate drain plug and drain any accumulated condensate.

- In case the condensate was deposited at the casing surface in the form of ice, heat the cold trap and thaw the ice, if needed.
- If necessary, open the housing cover to speed up defrosting.
- Dry the interior of the housing adequately.

➔ Dispose of condensate according to the respectively valid legal requirements.

➔ Screw the condensate drain plug in again; pay attention to O-ring 8.

➔ Open filling port of coolant container and pour out or allow remaining coolant to evaporate.

➔ Close the flange openings by using the original protective covers.

➔ Store the unit in a cool, dry place; preferably at temperatures between +5 °C and +40 °C

- For a longer period of storage, seal the pump in a PE bag with drying agents enclosed.

9.2 Disposal

Products or parts thereof (mechanical and electrical components, operating fluids, etc.) may cause environmental burden.

➔ Safely dispose of the materials according to the locally applicable regulations.

10 Technical data

Parameter	KLF 025	KLF 040	KLF 063
Flange (in)	DN 25 ISO-KF	DN 40 ISO-KF	DN 63 ISO-K
Flange (out)	DN 25 ISO-KF	DN 40 ISO-KF	DN 63 ISO-K
Mounting orientation	Vertical	Vertical	Vertical
Filling quantity coolant	0.7 l	1.5 l	3.8 l
Filling quantity condensate max.	0,1 l	0,4 l	0,75 l
For pumping speed up to	30 m^3/h	65 m^3/h	120 m^3/h
Weight	3.5 kg	6.5 kg	11.5 kg
Conductance	$1 \cdot 10^{-2}$ hPa: 10 l/s; 1 hPa: 60 l/s; 100 hPa: 800 l/s	$1 \cdot 10^{-2}$ hPa: 16 l/s; 1 hPa: 150 l/s; 100 hPa: 1000 l/s	$1 \cdot 10^{-2}$ hPa: 30 l/s; 1 hPa: 800 l/s; 100 hPa: 3000 l/s

10.1 Dimensions

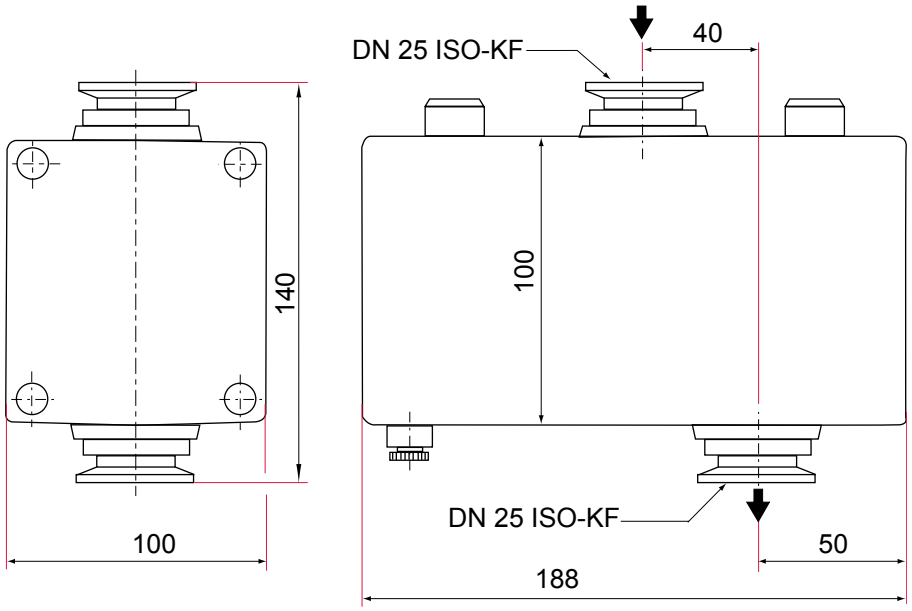


Fig. 5: KLF 025

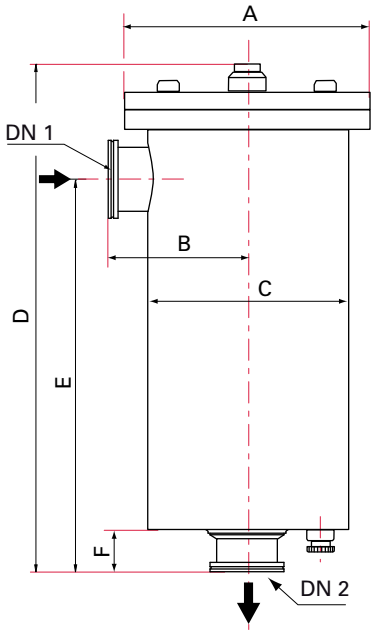


Fig. 6: KLF 040/063

Maße	KLF 040	KLF 063
A	ø 164 mm	ø 190 mm
B	92 mm	130 mm
C	ø 133 mm	ø 159 mm
D	350 mm	530 mm
E	242 mm	400 mm
F	27 mm	45 mm
DN1	DN 40 ISO-KF	DN 63 ISO-K
DN2	DN 40 ISO-KF	DN 63 ISO-K

11 Spare parts

The spare parts packages listed here are only applicable for standard models.

Please state all information on the rating plate when ordering spare parts. Other spare parts than those described in this manual must not be used without the agreement of Pfeiffer Vacuum.

11.1 Spare parts packages

Spare parts package	KLF 025	KLF 040	KLF 063
Set of seals	PK E47 031 -T	PK E47 032 -T	PK E47 033 -T

VACUUM SOLUTIONS FROM A SINGLE SOURCE

Pfeiffer Vacuum stands for innovative and custom vacuum solutions worldwide, technological perfection, competent advice and reliable service.

COMPLETE RANGE OF PRODUCTS

From a single component to complex systems:
We are the only supplier of vacuum technology that provides a complete product portfolio.

COMPETENCE IN THEORY AND PRACTICE

Benefit from our know-how and our portfolio of training opportunities!
We support you with your plant layout and provide first-class on-site service worldwide.

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