

Flap type flowmeter KLA



KLA, KLA-GS, KLA-V4A, KLA-IK,
KLA-IKS, KLA-EM

USER MANUAL

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Document D-713.12 forms an integral part of the supply and must be included in order to complete this document.

1. FOREWORD

These installation and operating instructions apply to KLA series flow meters. All information regarding installation, operation, servicing, and maintenance must be observed and complied with. These instructions are an integral part of the device; they must be kept in a suitable location near the operating site and be easily accessible to personnel at all times. In the event of interaction between different system components, the operating manuals of the additional equipment must also be taken into account.

2. SAFETY

2.1 Symbol and meaning



This symbol is found on all work safety instructions in these installation and operating instructions that refer to danger to life and limb. These instructions must be strictly observed.

2.2 General safety instructions and disclaimer

This document provides fundamental guidelines for the installation, operation, maintenance, and servicing of flap flow meters of the KLA series. Failure to observe these instructions can result in hazards to humans and animals as well as damage to property and assets, for which Kirchner und Tochter assumes no liability.

The operator is required to rule out potentially hazardous situations through voltage and released media energy.

2.3 Intended use

Flap-type flow meters of the KLA series measure liquid flow and can be installed horizontally or vertically. For vertical installation, the flow direction must be from bottom to top. Installation in the pipeline may only be carried out in accordance with these instructions. The suitable model of the flap flow meter must be chosen depending on the pipe diameter at the location of use. All limit values specified in data sheet D-713.12 must be strictly complied with. Any modifications or other changes made to the measuring device may be carried out solely by Kirchner und Tochter. Details regarding the process fluid and operating conditions are indicated on the scale.

2.4 Special safety instructions for glass devices



For safety reasons, we advise putting glass-walled flow meters into service with a protective shield. The devices must not be subjected to pressure surges during operation!

2.5 Safety instructions for operators and operating personnel

Staff commissioned with assembly, operation, maintenance, and servicing must possess suitable qualifications for their assigned tasks and be adequately trained and briefed. Every person tasked with assembly, operation, maintenance, and servicing must have read and understood the operating manual. Gaskets that come into contact with the process fluid must be renewed following maintenance and repair work.

2.6 Regulations and guidelines

Besides this manual, all relevant regulations, guidelines, and standards must be complied with. This applies especially to sector-specific applications and the health and safety regulations applicable in the country of operation.

For example: DIN EN, DVGW, VdS, etc.

2.7 Notice as required by the hazardous materials directive

In accordance with the law concerning handling of waste (critical waste) and the hazardous materials directive (general duty to protect), we would point out that all flow meters returned to Kirchner und Tochter for repair are required to be free from any and all hazardous substances (alkaline solutions, acids, solvents etc.).



Ensure that the devices are flushed to neutralize hazardous substances (See Chapter 10. Service: Decontamination Declaration).



Dieselstraße 17 · D-47228 Duisburg

Tel +49 2065 9609-0 Web www.bamo-kirchner.de

E-mail info@kt-flow.de

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3. TRANSPORT & STORAGE

Always use the original packing for transport, handling and storage. Protect the device against rough handling, coarse impact, jolts etc.!

4. INSTALLATION

Flap-type flow meters are suitable for installation in either vertical or horizontal pipe runs. In vertical pipe runs, flow must be from bottom to top. Ensure correct spacing and accurate pipe alignment at the installation site. To connect the KLA device, suitable flanges must be fitted to the pipe ends at the installation site. The undisturbed straight pipe length upstream and downstream of the installation point should be at least 2 x DN.

4.1 KLA Installation Position

For a horizontally installed KLA with flow direction left/right or right/left, ensure that the device is installed with the scale facing forward. Only in this way can proper operation of the device be guaranteed (see Fig. 1). If the flow meter is installed with the scale facing upwards or downwards, operation of the device is not possible (see Fig. 2).

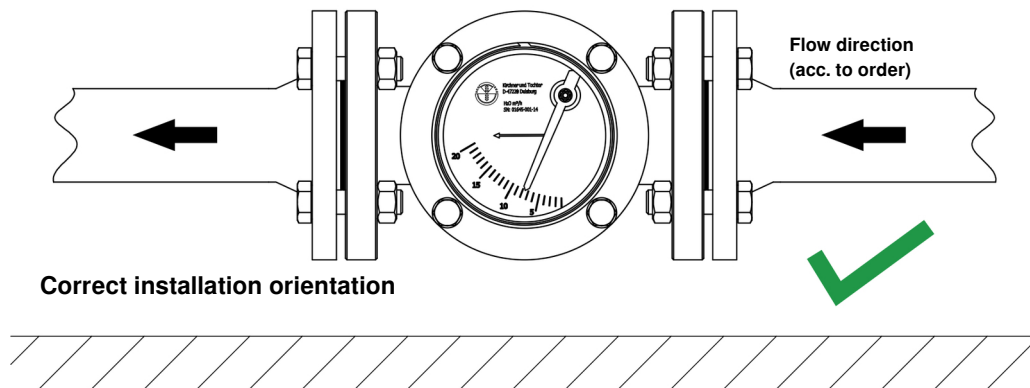


Fig. 1

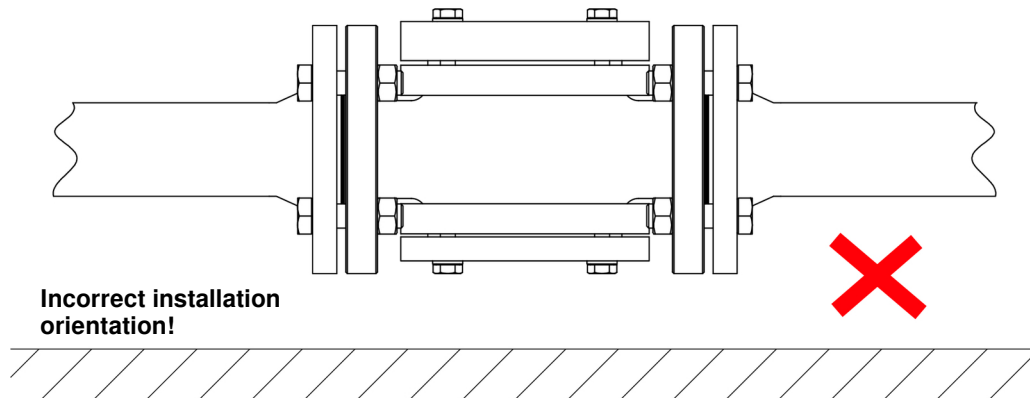


Fig. 2

4.2 Installation KLA

During installation, the connecting flanges of the KLA must be fitted with suitable flat gaskets. The gaskets are not included in the scope of delivery. Before installation, the transport restraint inside must be removed; the open line ends must be equipped with matching connection flanges. Precise alignment of the pipes and the correct distance between the sealing surfaces must be ensured. Install the device without mechanical tension, ensuring the flow matches the arrow indicated on the scale. Use rubber, PVC, or Teflon gaskets.

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5. START-UP

The device must be properly installed before it is started up.

1. Check all device connections.
2. Flow adjustment: Pressurize the lines by slowly opening the shut-off valves (risk of glass breakage).
When measuring liquids, ensure that all air is carefully bled from the piping system.
3. Check all components for leaks and retighten fittings or bolted connections if necessary.

6. READING DURING OPERATION

Readings for the standard KLA are taken at the pointer on the aluminum scale.

For the KLA-GS model, the flow rate is indicated directly by the flap. The flap flow meter features a tempered glass panel on both the front and back. The flow rate is read off the scale on the front glass pane, aligned with the top edge of the KLA flap.

The measured value is only accurate if the operating conditions at the measuring point (process fluid, operating pressure, and media temperature) match the specifications on the scale.

7. LIMIT VALUE SWITCHES

To provide local display with a monitoring function, the flow meter can be equipped with limit switches. The switching behavior is bistable and the switch point is adjustable.

The following models are equipped with limit switches:

KLA-IK, KLA-V4A-IK	SC3,5-N0-BU	- 2-Wire, NAMUR
KLA-IKS, KLA-V4A-IKS	SB3,5-E2	- 3-Wire, PNP

When switching inductive or capacitive loads (e.g. contactors, solenoid valves) or using long control cables, harmful current and voltage spikes can occur. We therefore recommend operation via a suitable isolating switching amplifier. It provides galvanic isolation between the sensor and the load, protecting the electronics from power surges and guaranteeing a long operational lifespan.



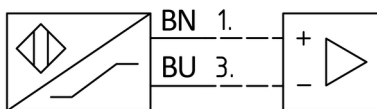
For technical data, please refer to data sheet D-713.12.

7.1 Connection of limit switches

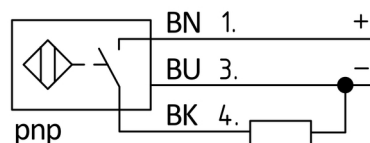


The electrical connection of the device must be carried out in accordance with relevant VDE regulations and local power utility guidelines.

1. Disconnect the system from the power supply before connecting the limit switch.
2. Use suitable protective circuitry for the limit switch matched to its load capacity.
3. Install upstream fuses rated according to the power consumption.
4. Electrical connection is made using the two or three screw terminals on the angled plug connector.



IK



IKS

7.2 Adjusting the limit switches

The KLA-IK/-IKS can be factory-preset to customer-specific switch points.

The switch point and switching function are determined by the pointer vane: The switching setpoint corresponds to the position at which the pointer vane enters the sensor. The switching function is defined by whether the pointer vane enters or exits the sensor slot when reaching the switch point.

7.2.1 Preparation

To make adjustments, remove the protective polycarbonate screen (see Fig. 3).

1. Using a narrow screwdriver, pry the retaining ring (6) out of its groove above the polycarbonate protective screen (5).
2. Remove the polycarbonate protective screen (5) and the O-ring (4) from the housing (3).
3. Ensure the O-ring (4) is not lost! It seals the scale chamber against dust and dirt entry.

The limit switches and the pointer vane are now accessible.

7.2.2 Setting the switch point

1. Manually move the pointer (12) to the flow rate value at which the switching operation should occur.
2. Hold the pointer (12) in place to ensure it cannot move during the adjustment procedure.
3. Depending on the desired switching function (Sec. 7.2.3), rotate the pointer vane (10) until the limit switch (8) triggers.
4. Verify the switching setpoint by manually sweeping the pointer (12) across the set value.

7.2.3 Adjusting the switching function

The switching behavior of the limit switch is determined by whether the pointer vane enters or exits the contact when reaching the set switch point.

2-wire SC3,5-N0-BU (NAMUR):

- Pointer vane detected → Current consumption ≤ 1 mA
- Pointer vane not detected → Current consumption ≥ 3 mA

3-wire SB3,5-E2:

- Pointer vane detected → Signal output closed
- Pointer vane not detected → Signal output open

7.2.4 Installing the polycarbonate protective screen

After successfully setting the limit switches (8), reinstall the polycarbonate protective screen (5).

1. Insert the O-ring (4) into the corresponding groove.
2. Place the polycarbonate protective screen (5) in position.
3. Ensure that the O-ring (4) remains properly seated in its groove.
4. Carefully insert the retaining ring (6) into the corresponding groove.

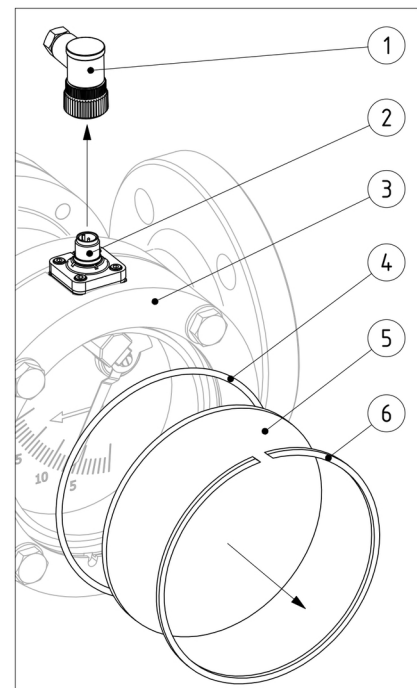


Fig. 3

7.3 Replacing the limit switch

1. Disconnect the M12x1 right-angle connector (1) or your sensor cable from the KLA plug (2).
2. Remove the polycarbonate protective screen (5) (refer to 7.2.1).
3. Carefully pull the cap (7) vertically off the slot sensor (8).
4. Take the limit switch (8) out of the base (11) and carefully unplug the connector (9/13).
Take care not to bump against the pointer vane (10)!
If necessary, turn it to the side.
5. Plug in the connector (9/13) of the new limit switch (8) and place it into the base (11).
6. Carefully fit the cap (7) onto the limit switch (8).
Ensure that the cable connector (9/13) and the cable are seated correctly.
7. If required, adjust the switch point back to its initial value.
8. Reinstall the polycarbonate protective screen (5) (refer to 7.2.4).

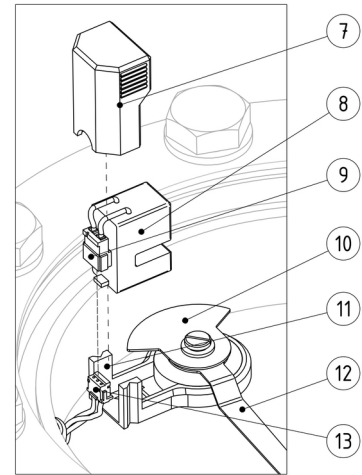


Fig. 4

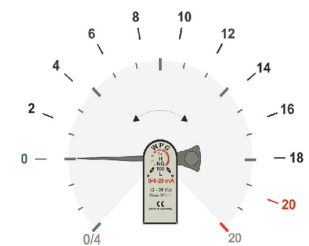
8. ANALOGUE OUTPUT EM

The EM angular position encoder is a 3-wire sensor that detects the pointer position and outputs it as a current signal (4 ... 20 mA). This signal can be used, for example, to implement a remote display.

Factory linearization is possible at up to 14 points. Furthermore various input and output filters ensure operation in industrial environments.

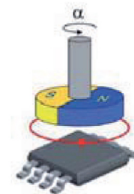
The following devices are equipped with an analog output:

KLA-EM with WPG NG100-L
KLA-V4A-EM with WPG NG100-L



8.1 Functional principle

The magnetic field direction of a rotatable magnet moved by a fork is measured contactlessly by a Hall sensor, digitally processed by a processor and converted into a 4 ... 20 mA output signal.

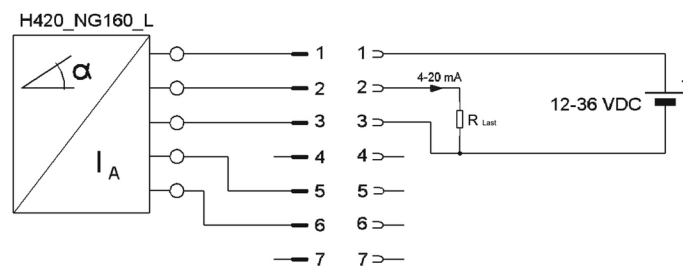


8.2 Connection

Terminals 1 (+Ub) and 3 (-Ub) serve as the power supply for 12 ... 36 V DC.

Terminal 2 (Iout) provides the analog current signal.

The current is measured between terminals 2 (Iout) and 3 (-Ub).



EM connection diagram



Refer to data sheet D-713.12 for technical data on the 4 ... 20 mA analog output.

9. MAINTANACE AND CLEANING

CAUTION



Escaping media can cause property damage and personal injury. Kirchner und Tochter accepts no liability for improper use. Before maintenance or cleaning, the process line must be shut off or drained.

Opening the KLA (rear side)

1. Undo the retaining screws of the rear cover and remove it.
2. Clean any dirt and deposits from the housing and flap.

Adjusting the flap shaft tension

Should the flap be loose or exhibit excessive play in its V4A bearing, it needs to be tightened.

1. Additionally open the device from the front.
2. Loosen the lock nuts and retighten the bearing screws, then tighten the lock nuts again.
3. Adjust the flap so that, without a gasket, it rubs very lightly against the front V4A disc.
With the gasket inserted, it will then have sufficient clearance.
4. Ensure that the pointer moves freely over the aluminum scale.
5. Tighten all screws diagonally in an alternating sequence.
6. Make sure to close and seal the device properly again.

10. SERVICE

All defective or damaged devices should be returned directly to our repair department. You will find the decontamination declaration for download and further information on returns in the service section of the Kirchner und Tochter homepage (www.kt-flow.de). To rule out any risk to our employees and the environment, legal regulations require us to only process devices for which a declaration of safety (decontamination declaration) is provided.

11. DISPOSAL

Help protect the environment: Ensure all workpieces are properly reused or disposed of in accordance with local regulations.



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