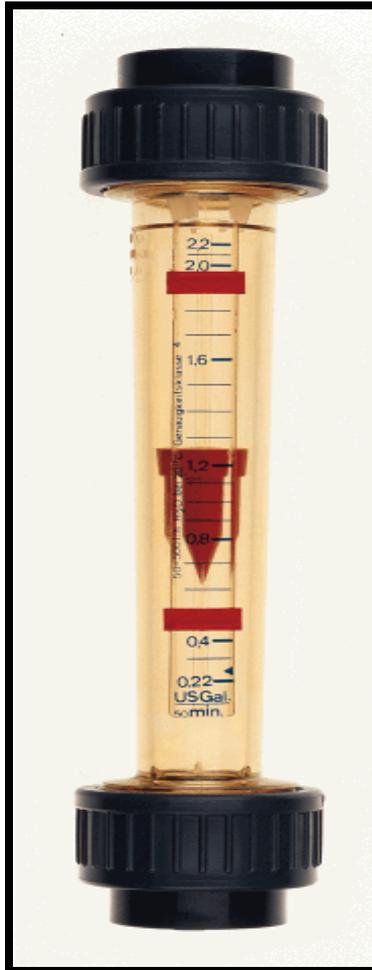


# KOBOLD KSK FLOWMETER

## User Instructions



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## KOBOLD KSK FLOWMETER User Instructions

**CAUTION:** For safety reasons, please read the cautionary information located at the end of the manual, before attempting installation.

### 1.0 General

The KOBOLD KSK flowmeter is a low volume flow measuring device, intended for applications in which the corrosion resistance of synthetic materials (plastic) is required. The KSK operates on the principle of the variable area flowmeter (float in a conical tube or “rotameter”).

The KSK may be factory-fitted with switches to allow control of external electronics.

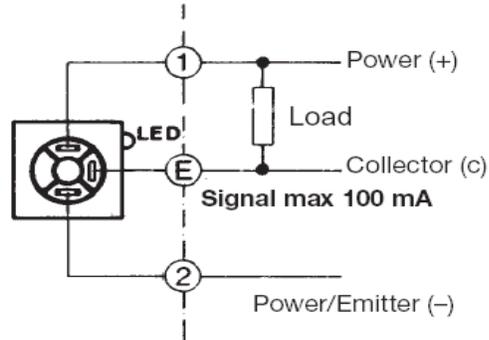
### 2.0 Specifications

Table 2.1; Technical Data

Operating Principle:	Float in a conical tube
Display:	Direct reading, calibrated for H <sub>2</sub> O or Air
Overall Series Flow Range:	From: 0.006 to 4.4 GPM Water, 0.06 - 62 SCFM Air
Maximum Operating Temperature:	140° F w/ PVC Fittings  180° F PSU w/ Polypro, brass, or stainless steel fittings 250° F PVDF (180°F w/ switch)
Maximum Operating Pressure:	145 PSI

Table 2.2; Material Construction

Body:	Polysulfone, Trogamid or PVDF (based on model number)
Float:	PVDF
O Rings:	EPDM
Fittings:	PVC, PVDF, stainless steel or brass (based on model number)

Diagram 2.1; Wiring Diagram of Transistor SwitchTable 2.3 Switch Specifications**Transistor Switch:**

Type: NPN, open collector, Bi-stable

Operating voltage: 9 to 24 VDC

Operating current: 100 mA max.

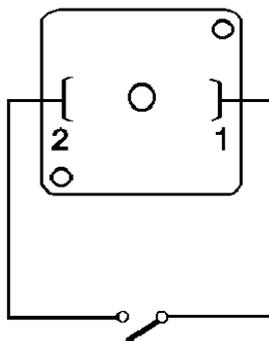
Output signal: Float Above Contact: LED on (Pin 1-Pin E: closed)  
 Float Below Contact: LED off (Pin 1-Pin E: open)

**Reed Switch:**

Type: SPST, N/O or N/C (depends on order code)

Operating voltage: 130 VAC max.

Operating current: 0.5A, 10 W / 10 VA

Diagram 2.2 Wiring Diagram of Reed Switch

### 3.0 Installation Instructions

**CAUTION: For safety reasons, please read the cautionary information located at the end of the manual, before attempting installation.**

#### 3.1 - Mounting

The KSK comes supplied with process fittings and union nuts. To install the instrument, simply:

1. Remove the fittings from your KSK by loosening the union nuts.
2. Place union nut over pipe to which you wish to connect.
3. a.) Glue connections: Per manufacturer's instructions, use a suitable PVC adhesive to glue fittings in place and let cure.  
  
b.) Threaded connections: Apply a suitable thread sealant to the male mating threads and hand tighten the insert fitting just enough to prevent leaks.
4. Fasten connectors to KSK with the union nuts, taking care not to overtighten the assembly. If necessary, only use a strap wrench on the nuts. **DO NOT USE** a pipe wrench, pliers, or any other sharp instrument on the fittings, as this may compromise the strength, and eventual safety of the instrument.

NOTE: The KSK must be installed vertically (long axis), with the inlet at the bottom. There are no straight run requirements for the inlet/outlet piping.

### 4.0 Operation

We recommend that, if possible, the medium be introduced to the instrument in gradually increasing amounts. This procedure serves two basic functions:

1. It prevents excessive oscillation of the float upon sudden introduction of media (particularly gases).
2. It prevents possible damage to the instrument caused by pressure surges (as described in the cautionary section).

#### 4.1 - Reading the Flow Rate

Flow rates measured by float type devices are typically read at the largest float diameter. In the case of the KSK, this is the top edge of the float.

#### 4.2- Adjusting the Setpoint Switches

All setpoint switches are adjusted in an identical fashion. To adjust a setpoint:

1. Loosen the holding screw found on the setpoint indicator body, near the V-groove.
2. Slide the indicator to the desired setpoint value.
3. Retighten the holding screw, taking care not to overtighten.

#### 4.3 - Operating the Setpoint Switches

The setpoint switches will output a signal to indicate change of flow status. There are two possible states for the switch to be in: One indicates that the float is located above the setpoint position, and the other that the float is below the setpoint position. Wiring diagrams for the setpoint switches are shown in Diagrams 2.1 and 2.2.

#### 5.0 Maintenance

The major enemy of float-type flowmeters is dirt and large debris. We recommend that only clean or filtered media be passed through the device. If using a setpoint switch, it is particularly important to guard from contamination by ferritic (metal) materials due to the magnetic insert encapsulated within the float. To protect from the type of debris, we suggest the installation of a magnetic filter, such as a KOBOLD MFR, or equivalent.

#### 6.0 Arrival of Damaged Equipment

Your instrument was inspected prior to shipment and found to be defect-free. If damage is visible on the unit, we advise that you carefully inspect the packing in which it was delivered. If damage is visible, notify your local carrier at once, since the carrier is liable for a replacement under these circumstances. If your claim is refused, please contact KOBOLD Instruments for further advisement.

#### 7.0 Need help with your KSK?

Call one of our friendly engineers at 412-788-2830.

## **Caution**

PLEASE READ THE FOLLOWING GENERAL FLOW METER/ MONITOR WARNINGS BEFORE ATTEMPTING INSTALLATION OF YOUR NEW DEVICE. FAILURE TO HEED THE INFORMATION HEREIN MAY RESULT IN EQUIPMENT FAILURE AND POSSIBLE SUBSEQUENT PERSONAL INJURY.

- Inspect instrument for damage upon arrival. Cracked, fractured, bent or otherwise damaged instruments must not be put into use, since the device is weakened to an unknown extent. (The operations and installation guide will explain how to make a claim on damaged instruments.)
- Under NO circumstances must the maximum tolerances (temperature and pressure) be exceeded.
- The maximum tolerances of the device have been determined using water and air. If using other media, especially corrosive, it is critically important that the user determine chemical compatibility with our instruments. KOBOLD Instruments Inc. cannot accept responsibility for failure and consequences resulting from use of media other than water or air.
- Install the device in a fully supported position within your flow system. This avoids excessive stresses which may damage the instrument. In particular:
  - a. Ensure that the plumbing leading to and from the instrument is fully supported and that the instrument does not perform the physical function of a joint.
  - b. When calculating stress on the device caused by plumbing, the weight of the medium in the pipes must be considered as well.
  - c. Misaligned runs of rigid piping can cause large stresses when connected to the instrument. Do not connect in such a fashion.
- During installation, avoid stresses on the instrument by following guidelines given below:
  - a. When connecting fittings, hold the instrument fittings rigid with a strap wrench. Do not install by twisting the instrument into the pipe fittings.
  - b. Do NOT install by holding the device housing to provide counter-torque to the pipe fitting.
  - c. Use an appropriate amount of a suitable sealant on male threads of NPT fittings. This reduces the twisting stresses produced by tightening the fittings into each other.
  - d. Do not use pliers or wrenches on the housing, as this may damage it.
  - e. Do not overtighten, as this may fracture the fittings.

- During operation, there are a number of situations to avoid:
  - a. The sudden cessation of fluid flow causes what is typically referred to as "water hammer". Most people are familiar with this phenomenon from their home experience - it is the cause behind the loud clank of water pipes which occurs when faucets are turned off too suddenly. The cause behind this "water hammer" is quite easy to visualize. Water is fairly massive. The amount of water in long runs of pipe is quite substantial. When the faucets are turned off suddenly, especially from a full on condition, the water has considerable momentum and does not want to stop flowing. The situation is similar to stopping a car by running into a wall, rather than by applying brakes. Both are sudden rather than gradual. The damage to the wall can be substantial (not to mention the car).

The "water hammer" causes surges in fluid pressure which could cause the measurement instrument's pressure limit to be exceeded, resulting in failure and possible personal injury.

- b. Fluid surges, as well as the water hammer, can be particularly damaging to empty flowmeters since there is no back pressure in the device. The damage is caused, once again, by momentary excess pressure. To avoid these surges, fluid lines should remain full (if possible) and water flow should be introduced to the device slowly.
- c. If the instrument is isolated with inlet and outlet valves, the flowmeter must be completely drained when said valves are both closed. Failure to do so could result in damage to the device caused by thermal expansion of fluid.
- d. Freezing of water in the instrument must be avoided since the resultant expansion will damage the flowmeter and make it unsafe for use.