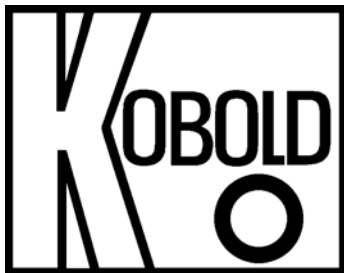


SFL Turbine Wheel Flow Meter

User Instructions



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1. General

CAUTION! For safety reasons, please read the cautionary information located at the end of the manual before attempting installation. Additionally, please read these operating instructions before unpacking and placing the unit into operation. Follow the instructions precisely as described.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

Any use of the SFL that exceeds the manufacturers specifications may invalidate the warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

2. Need help with your SFL?

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

3. Operating Principle

The Kobold Model SFL turbine flow sensor is designed to measure low volume flows of low viscosity, transparent fluids with a high degree of accuracy. Fluid flow through the device sets the turbine wheel in rotary motion. The housing geometry and lightweight turbine wheel, together with the incoming liquid, causes the rotor to be held in suspension. This suspension of rotor guarantees a long working life of the unit. The unit employs an infrared transmitter/receiver pair where the infrared transmitter emits a beam of light that activates the receiver. The motion of the turbine wheel is thus detected in a non-contacting manner and is transformed into pulses. The resulting output signal is linear and proportional to the flow rate. The mounting position of the unit is universal.

4. Instrument Inspection

Instruments are inspected before shipping and sent out in perfect condition. Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service/forwarding agent immediately, as they are responsible for damage occurring during transit.

Scope of delivery:

- Turbine Flow Meter model: SFL
- Operating Instructions

5. Mechanical Installation

- Make sure that the actual flow rate does not exceed the measuring range of the unit.

Attention! Exceeding the measuring range (over 20%) can damage the axle bearings, which in turn, will cause irreparable damage to the device.

- Make sure that the permitted maximum working pressure and temperature limits for SFL are not exceeded.
- Make sure that the power supply of the unit is in agreement with the operational data of the unit.
- Remove all the packing material meant for safe transportation and make sure that no packing material finds its way inside the unit.
- The unit mounting is position independent, however, the flow must always follow the direction of the arrow stamped into the body of the device.
- In particular, when flow is from top to bottom, ensure that the flow chamber is filled completely by the medium. No additional up/downstream straight-run piping is required.
- The sealing of the connection threads should be accomplished by using Teflon tape or similar material.
- During installation of the unit, it must be observed that no excessive torsional or tensile stress is applied to the connection threads. We recommend that the inlet and outlet piping should be mechanically supported at a distance of about 2 inches from the connection fittings.
- If possible, after the mechanical installation is complete and checked, it should be tested for leaks in the piping and connection threads.

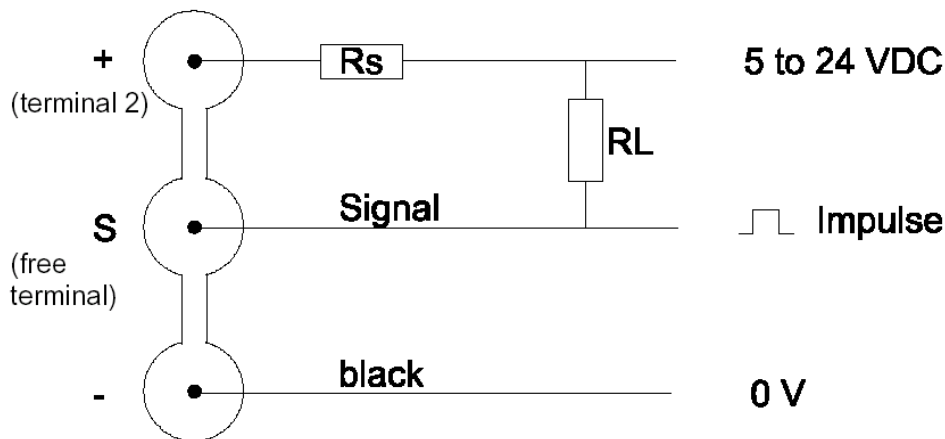
6. Electrical Connection

Attention! Make sure that the supply voltage of your system is within the voltage requirements for the device.

- Make certain that the power supply lines are not energized.
- Connect the flowmeter electrical cable with your power supply cable in the manner shown below.

Attention! An incorrect cable connection will result in damage to the unit's electronic circuitry.

- Supply voltages from 12-24 VDC require a current limiting resistor (R_s) to be installed as shown in the diagram. A $900\ \Omega$ resistor is suitable for supply voltages within this range. This resistor is not required for supply voltages below 12 V.
- A $2200\ \Omega$ pull-up resistor (R_L) is always required for operation.
- After the correct supply voltage is applied and the signal output is connected, the unit is ready for operation.



$R_L = 2.2\ \text{k}\Omega$ (Required pull-up resistor)

$R_s = 50\ \Omega/\text{V}$ (Current limiting resistor for 12-24 VDC power sources, value based upon input supply voltage)

Example:

Value of R_s with connection from 18 VDC supply voltage:

$$R_s = 50\ \Omega/\text{V} \times 18\ \text{V} = 900\ \Omega$$

7. Operation

- Please pay close attention to the technical specifications of this flow meter.
- Verify the connecting wires for correct polarity and voltage.
- Adjust your evaluating electronics for a pulse rate of 22680 pulses/gallon.
- Check if the pipe and connection thread joint is properly sealed.
- To avoid excessive pressure conditions, the media to be measured should be introduced to the unit slowly.

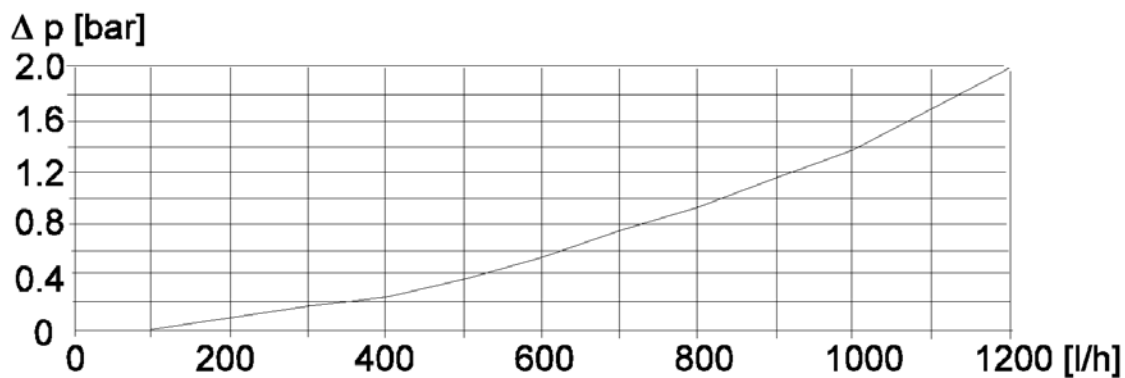
Caution! Pressure spikes generated by abrupt inflow may (through magnetic valves, ball valves or similar devices) cause destruction of the unit via a condition commonly known as “water hammer”. During normal operation, it must be assured that the measuring device operates only if the chamber is fully filled with the medium to be measured.

Caution! Large pockets of air in the measuring chamber may lead to incorrect measurements as well as failure of the internal bearings.

8. Specifications

| | |
|-----------------------|--|
| Media Temperature: | 0 °F to +212 °F |
| Operating Pressure: | 232 PSIG (max. 580 PSIG @ 68°F) |
| Measuring Accuracy: | +/- 1% of flow rate |
| Power Supply: | 5 - 24 VDC (12 - 24 mA) |
| Output signal: | NPN Open Collector pulse (~ 2000 Hz. Max.) (Requires 2200 Ohm pull-up resistor) |
| K-Factor: | 22680 pulses/gallon |
| Wetted Materials: | PVDF, Vectra |
| Mechanical Connection | |
| SFL-1120 | G-3/8 male thread |
| SFL-1120S | 3/8" (10 mm) hose barb |
| Electrical Connection | |
| SFL-11... | 12", 3-wire, flat ribbon cable molded into housing |

9. Pressure Loss



10. Ordering Codes

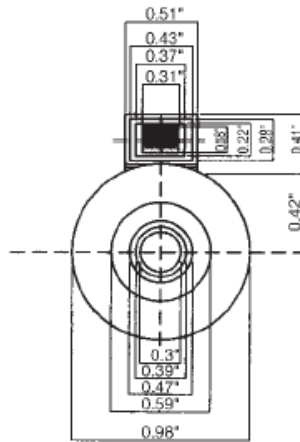
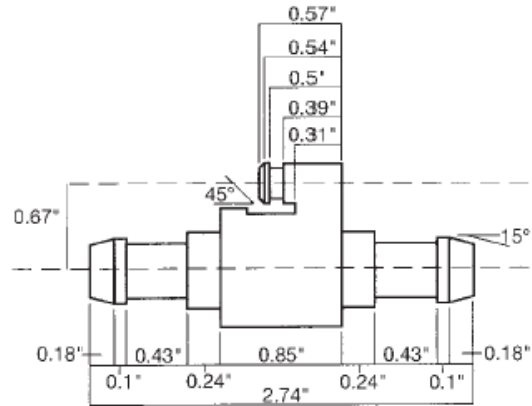
| Model | Material | Connection | Measuring range GPM water | Output frequency |
|-----------|-------------|----------------|---------------------------|------------------|
| SFL-1120 | PVDF/Vectra | G 3/8 male | 0.26 – 5.3 | 100-2000 Hz |
| SFL-1120S | PVDF/Vectra | 3/8" hose barb | 0.26 – 5.3 | 100-2000 Hz |

11. Maintenance

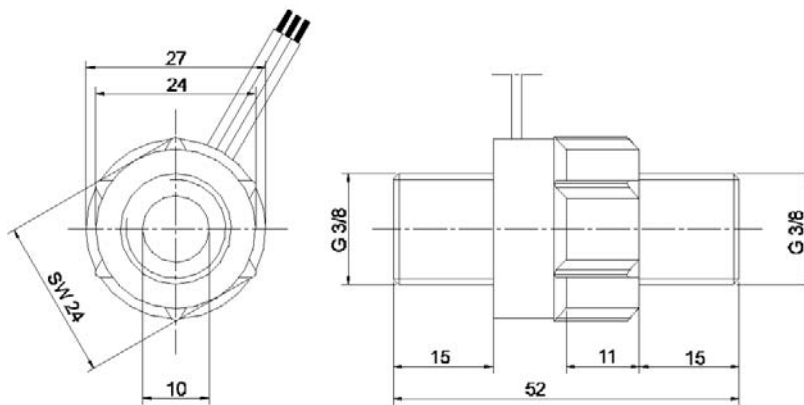
If the medium to be measured is clean, the SFL unit is maintenance-free. To avoid problems, we recommend the use of an appropriate filter with a 200 micron rating.

12. Dimensions

SFL-1120S



SFL-1120



13. Cautionary Information

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

- Inspect the instrument for damage upon arrival. Cracked, fractured, or otherwise damaged instruments must not be put into use, since the device is weakened to an unknown extent.
- Under NO circumstances must the maximum tolerances of flow, pressure, temperature, or supply voltage be exceeded.
- The maximum tolerances of the device have been determined using water, air, and/or oil. If using other media, especially corrosive media, 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 the use of media other than water, air, mineral oil or nitrogen.
- The sudden cessation of fluid flow causes what is typically called water hammer. Water hammer is a transient force caused by the transfer of momentum of a flowing fluid to the piping system when the flow of fluid is suddenly stopped (i.e. pump trip or valve closure).
- Water hammer can cause fluid pressure surges, which could cause the flow measuring device's pressure limit to be exceeded, resulting in equipment failure and possible personal injury. These pressure surges can be particularly harmful if the flow instrument is empty since there would be no backpressure in the device. To avoid these pressure surges, the fluid lines should remain full and flow should be introduced and isolated from the system slowly.
- Freezing of fluid in the instrument must be avoided since the resultant expansion will damage the flowmeter and make it unsafe for use.