

FlowJam S

Bulk Flow Detection



Operating Instructions



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1 General

The radar flow detector FlowJam S indicates the flow of bulk materials which move through the detection range (fig. 1) at a minimal required speed of 0.1 m/s.

The detection is executed by evaluating the Doppler's effect, thus independent of the flow direction.

The material flow, which can be in metallic or non-metallic tubes, wells, free fall distances and discharge points, is indicated by a relays.

The sensor distinguishes between two conditions

- material flow
- material jam or standstill.

FlowJam S can be adapted to extreme process conditions like high temperature by a separating flange equipped with a window especially for microwaves.

The operation of FlowJam S is postage-free.

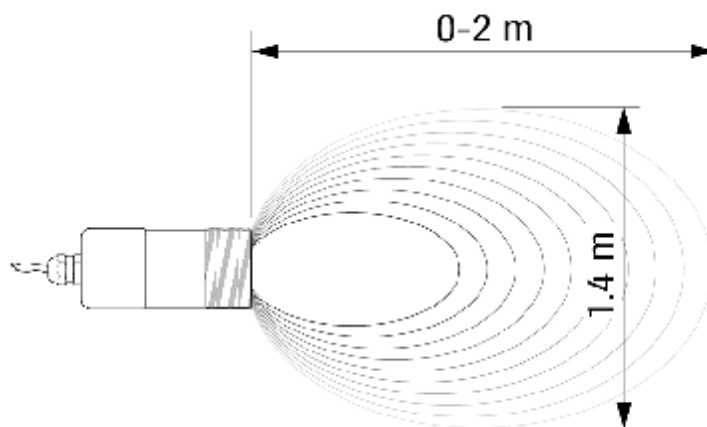


Fig. 1: Detection range

2 Technical Data

Sensor	
Voltage	12 V DC
Power consumption	Approx. 1,5 VA
Housing	Stainless steel 1.4541
Protection system	IP 65
Max. ambient an process temperature	-20...+80 °C
Dimensions	See Fig. 2
Max. working pressure	1 bar
Detection range	0 – 2 m (dependent on application)
Min. required material speed for detection	0.1 m/s
Measuring frequency	K-Band 24.125 GHz ± 100 MHz
Transmitting power	Max. 5 mW
Weight	Approx. 560 g

Transmitter	
Power supply	24 VDC / 0,2A
Power consumption	Approx. 3,4 VA
Current consumption	150 mA at 24 V
Relay (max.)	
• Voltage	Max. 125 VAC
• Current	Max. 1A
• Capacity	60 VA
Fall-delay time	1s...15s (continuously adjustable)
Weight	Approx. 100 g

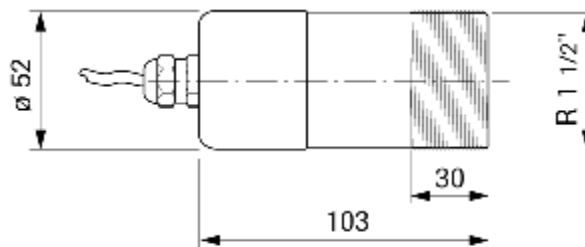


Fig. 2: Dimensional drawing

3 Installation

3.1 Basic remarks

FlowJam S has to be mounted at an angle between 45° and 90° to the flow direction of the bulk material.

Be careful that no parts within the detection range are moving, because this might be detected as a material flow.

Moving parts within the area of detection have to be screened.

3.2 Installation of the sensor in general

The installation of the sensor depends on the conditions of the site.

For example, the sensor can be

- screwed directly into an existing thread type R11/2" (fig. 3)
- fixed by a flange (fig. 4)
- mounted with the help of a pipe clamp (fig. 5)

Before installation, make sure that neither the medium temperature nor the pressure within the piping or the container require additional measures like e.g. the mounting of a separating flange pervious for microwaves (fig. 6).

When used with non-conductive tubes, detection is carried out via the side of the tube. It is not necessary to make a separate hole into the tube.

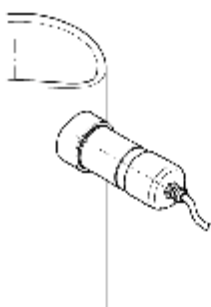


Fig. 3: Thread mounting

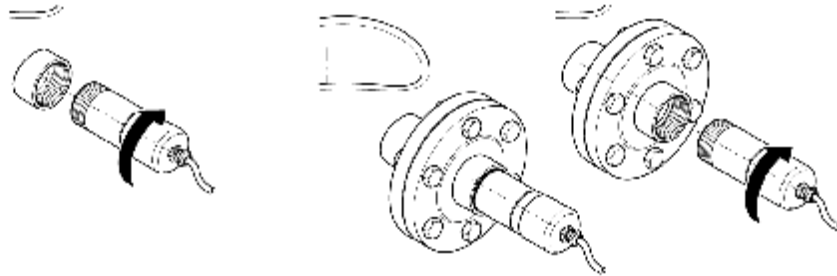


Fig. 4: Flange mounting

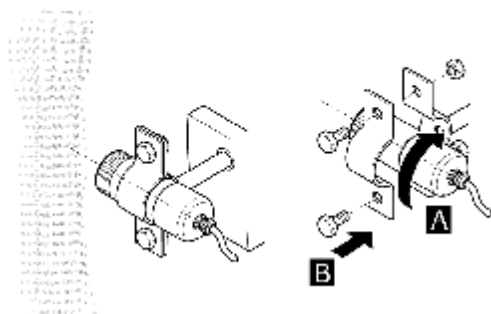


Fig. 5: Mounting with pipe clamp

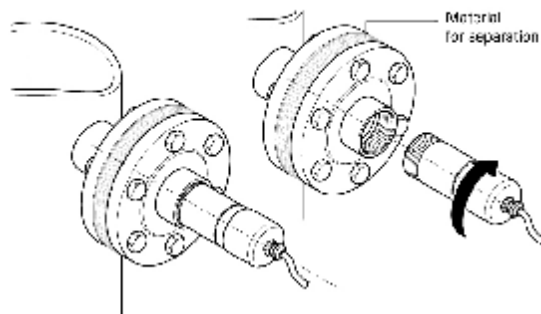


Fig. 6: Mounting with separating flange

3.3 Installation of the sensor on conveyor belts

If possible, the installation on conveyor belts is to be executed in the area of the discharge point.

If FlowJam S is installed directly above a conveyor belt or if the bulk material to be detected does not show much profile, the sensor should be mounted at an angle of approx. 70 - 80° (fig. 7).

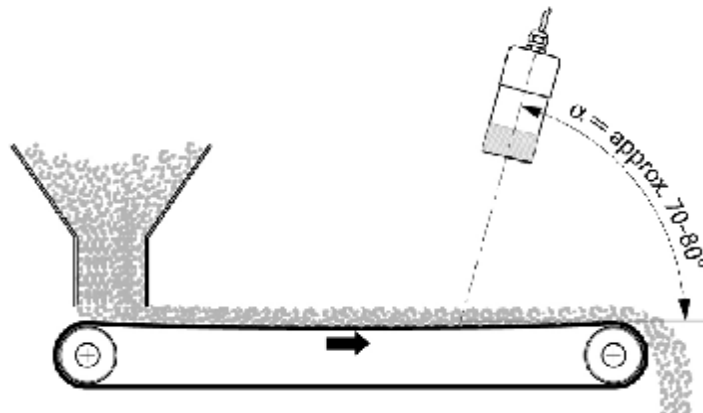


Fig. 7: Installation above conveyor belt

4 Connection

The connection of the sensor and transmitter has to be carried out according to fig. 8 and 9. A maximum length of 150m cable between sensor and transmitter should not be exceeded.

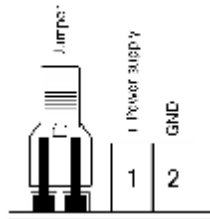


Fig. 8: Wiring diagram for sensor (standard-version: with Jumper / High-Version: without Jumper)

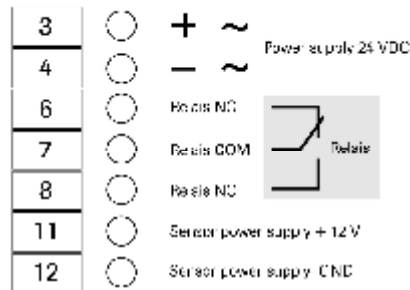


Fig. 9: Wiring diagram for transmitter

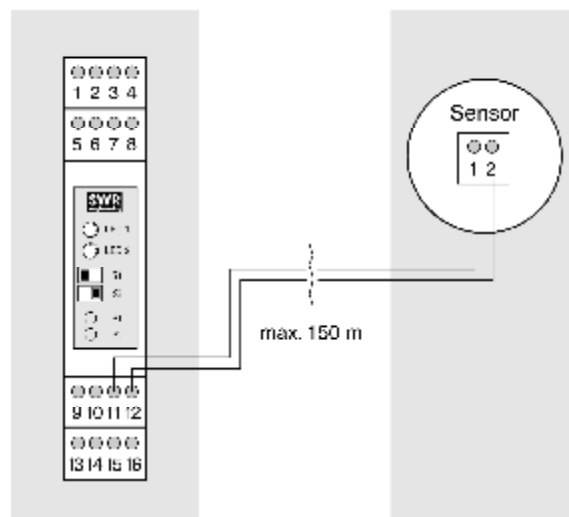


Fig. 10: Wiring of sensor and transmitter

5 Commissioning

All operational controls required for the alignment are shown in fig. 11.

Control elements:

- LED1: Signal strength
- LED2: Material flow
- S1: Switching between working current and closed current
- S2: Coarse adjustment of sensitivity
- P1: Threshold level
- P2: Delay time

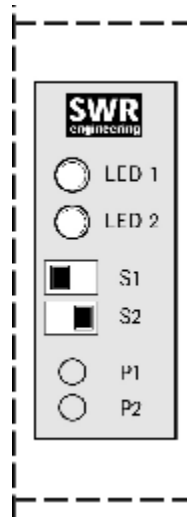


Fig. 10: Position of control elements

Switch S1

The position of switch S1 determines, whether the relay is attracted up or released at material flow.

Position "2" (off) causes alarm in case of material flow:

- material flow - relay is attracted
- contacts 7+8 closed
- no material flow - relay is released
- contacts 6+7 closed

Position "1" (on) causes alarm when there is no material flow:

- material flow - relay is released
- contacts 6+7 closed
- no material flow - relay is attracted
- contacts 7+8 closed

LED 1

The LED 1 (red) lightning shows the signal strength by its luminosity; that is, no lightning if no reception signal (no material flow, no vibrations, etc.), weak lightning if low and strong lightning if intense reception signal.

LED 2

The LED 2 (green) lights always up, if material flow is detected; this display is independent of the position of the switch S1.

Adjustment of sensitivity

Hereto use switch S2, potentiometer P1 and P2.

The control elements are in the following positions at the delivery (this basis is crucial for the commissioning):

- P1 (fine adjustment of sensitivity): at the left lay, thus insensitive
- S2 (coarse adjustment of sensitivity): switch at (on), thus relatively insensitive
- Jumper on sensor electronic (coarse adjustment of sensitivity): put on, thus relatively insensitive
- P2 (delay time): at the left lay, thus minimal delay of 1s

Now start your machine in order to guarantee material flow. In consequence the LED 1 must glow. If the LED 1 doesn't glow, then the switch S2 has to be set on (off). If there is still no lightning, then either the sensor has to be aligned differently, and/or the jumper has to be pulled out.

Now choose the position of the switch S1 accordingly, if the relay has be turned on or off at material flow.

Enhance the sensitivity so long until the LED 2 glows and the relay switches off or on.

If you interrupt the material flow, both LED lightning must go out, whereas the LED 2 goes out at the latest if the delay time ends.

Finally, you can adjust the delay time according to your requirements with potentiometer P2 in the range of 1s...15s.

6 Troubleshooting

If LED 1 does not light up even at the largest possible amplification, the following points must be checked:

- properties of the material flow (see e.g. fig. 7)
- positioning of the installation
- distance between the sensor and the material flow

If LED 1 lights up without an existing material flow and with minimal amplification adjusted on S2 and P1, it is very likely that the sensor detects the motion of something else or vibrations.

Does the LED 1 lights up continuously, then either there is no connection between sensor and transmitter, or the sensor is broken.

7 Notice

- Avoidance of reflection by vibration or moving line parts
- Setting of the amplification by Potentiometer P1 until just of the switching threshold (LED 2 glows)

8 Declaration of conformity

Conforms to the following Product Specifications

Ref. No.	Date	Ref. No.
EN 55011	Edition 90	ENV 50140
EN 60555-2	1987	EN 50141
EN 50081-1	1992	ENV 50142
EN 50082-1	1992	
pr EN 50082-1	1994	
pr EN 50082-2	1994	

The product herewith complies to requirements of the EMC Directive 89/336/EEC.