

FlowJam Plus

Material flow monitor
with blockage detector



Use

The FlowJam *Plus* is a logical development of the established FlowJam sensor which has proved its worth in thousands of applications.

In addition to the rapid detection of material movement (Flow/NoFlow), the FlowJam *Plus* also provides an additional "Detection of blockage" or "Material flow interruption" function. It can therefore also provide additional information when it detects a NoFlow condition as to whether the line is full or empty. The system operates without contact using microwaves with the material movement being detected using the Doppler effect.

FlowJam *Plus* is a particularly reliable device since microwaves can pass through material accumulations on the sensor and still detect material movements beyond them.

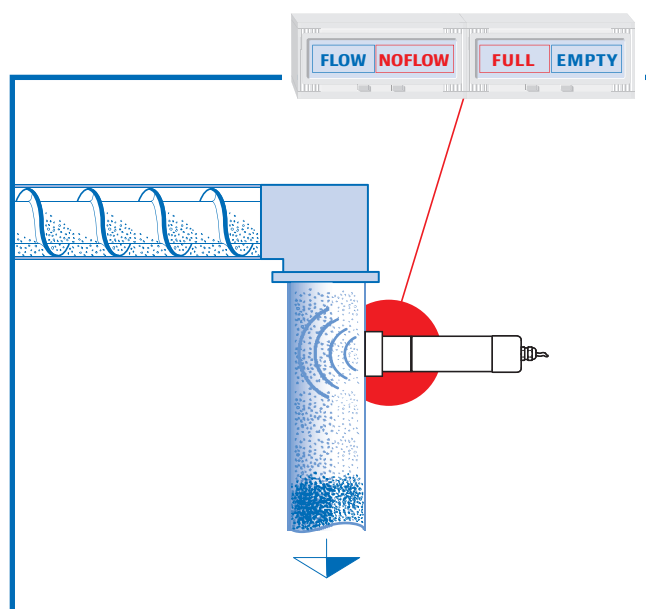
The measurement can be taken from outside all non-metallic tank walls, housings, hose lines or pipelines. Even in difficult conditions, in other words high operating temperatures and pressures and in explosion-protection design for potentially explosive environments, the FlowJam *Plus* can be used with the help of a process adapter (see page 4).

Function

The FlowJam *Plus* sends microwaves into the pipeline in which the material flows. This may be a freefall pipeline or a pneumatic transport system.

The microwave signals are reflected by the moving solid particles. A shift in the Doppler frequency between the emitted and received signals means that the material is moving, in other words "Flow". If this Doppler shift does not take place, there is no material movement and the sensor indicates "NoFlow".

If this state occurs, the FlowJam *Plus* can detect on the basis of clear characteristic values from the reflection signal whether a blockage has formed from below of the material supply has been interrupted from above. This switching condition is output by a second relay.



Application examples

▪ Transfer point

Chips of wood are transported by two screw conveyors in a biomass plant.

At the transfer point between the screw conveyors, FlowJam *Plus* monitors the flow of material.

If the material flow stops, it can quickly detect with the problem exists because the bottom screw conveyor is not discharging material or the supply screw conveyor is not supplying material.

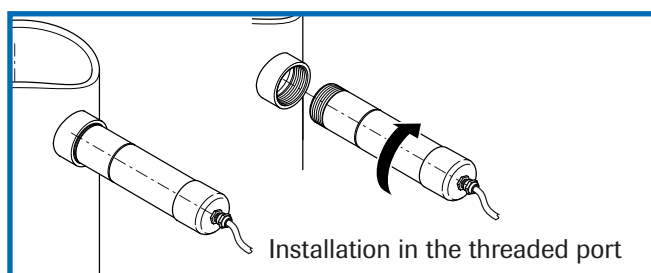


Material infeed to a bucket wheel feeder

In a chalk plant, chalk falls into the infeed of a bucket wheel feeder through a vertical fall pipe. This is designed to ensure that there is always an adequate flow of material into the feeder. If a material column up to the level of the sensor position is formed, the FlowJam *Plus* indicates precisely that this state has been achieved. The supply can be controlled better with this information.

Installation

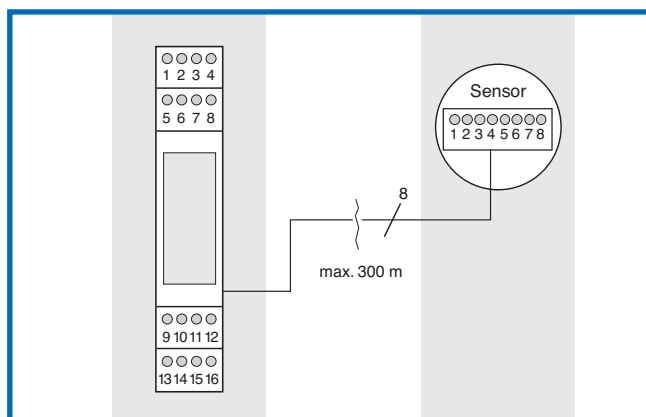
The FlowJam *Plus* sensor is installed on the line using a G 1½-inch threaded port.



System

A complete measuring point consists of the following components:

- FlowJam *Plus* sensor
- DIN rail connector



Sensor	
Housing material	1.4571
Protection type	IP 65
Process temperature	-20 ... +80 °C -20 ... +220 °C (with process adapter) Up to 1000 °C (with ceramic flange)
Ambient temperature	-20 ... +60 °C
Operating pressure	Max. 1 bar Max. 20 bar (with process adapter)
Power supply	18 ... 24 V DC / AC
Operating frequency	24.125 GHz; ± 100 MHz
Transmission power	Max. 5 mW
Weight	1.0 kg
Dimensions	Housing: Length 216 mm / Diameter 52 mm
	Thread: Length 30 mm / Diameter G 1½"

Transmitter (DIN rail)	
Power supply	18 ... 24 V DC
2x relay output	
• Voltage	Max. 250 V AC
• Current	Max. 1 A
• Consumption	Max. 60 W
Communication	USB
Response Time	1 ... 15 s (infinitely variable)
Weight	Approx. 172 g



certified according to
ATEX

Use as pressure / temperature adapter

The FlowJam *Plus* sensor can be used at a pressure of one bar and temperatures up to 80 °C.

A pressure adapter made of POM is available for higher pressures (up to 20 bar), whilst a temperature adapter made of Tecapeek (up to 220 °C) is available for higher temperatures

Mounting of pressure / temperature adapter

The pressure / temperature adapter is installed in the same way. It is screwed into a G 1½-in threaded port provided by the customer.

The FlowJam *Plus* housing is screwed into the internal thread of the adapter.

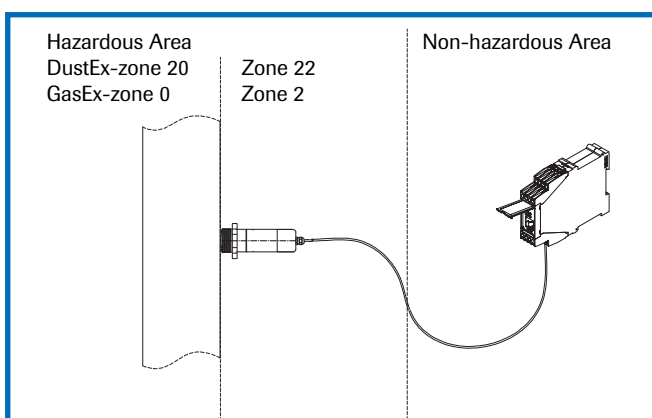
Technical data

Material	Stainless steel 1.4571, POM diaphragm	Stainless steel 1.4571, Tecapeek diaphragm
Temperature	-20...+80 °C	Up to +220 °C
Pressure	Up to 20 bar	Up to 20 bar
Thread	G 1½-inch both sides	G 1½-inch both sides
Wrench width	55 mm	55 mm



Use for separation of explosion-areas

Both adapters can also be used as zone isolators in potentially explosive atmospheres (dust). According to DIN EN 13463-1 "Non-electrical equipment for use in potentially explosive atmospheres. Basic method and requirements" devices in Group II D must be designed so that in application conditions there is no risk of ignition caused by electrostatic charges.



This is achieved by limiting the surface of the non-conductive part of the process adapter (diaphragm made of POM or Tecapeek).

The maximum area of the non-conductive part under DIN EN 13463-1 is as follows:

- Cat. 1: Dust potentially explosive zone 20 (250 cm²)
- Cat. 2: Dust potentially explosive zone 21 (500 cm²)
- Cat. 3: Dust potentially explosive zone 22 (unlimited)

As the non-conductive area of the process adapter is 10.75 cm² the maximum limit values are not exceeded. This means that when using the FlowJam *Plus* sensor with the process adapter, measurements can be taken in all potentially explosive areas as long as at least a dust potentially explosive zone 22 or gas potentially explosive zone 2 exists outside the transport pipeline or tank.