

# 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. Therefore it also can provide additional information about, if the pipe develops a plugging and Flow/No-Flow indications. 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.

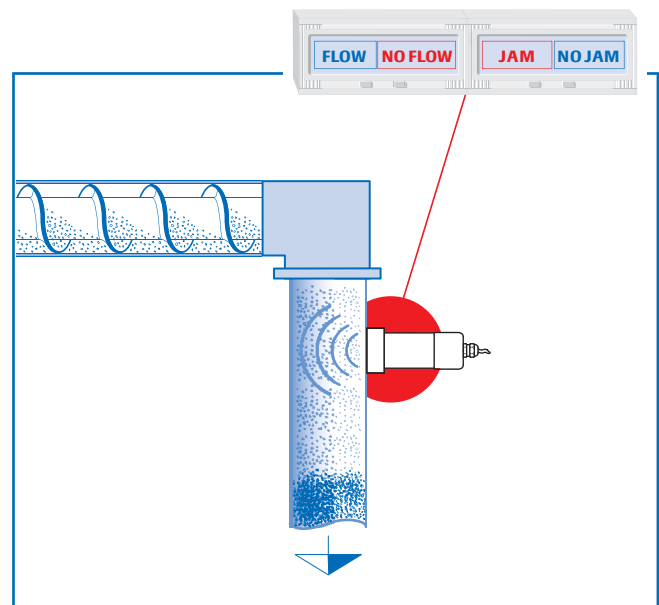
The measurements can take place as well outside of non-conductive containers such as bins, tanks, silos or hoses and conveying lines.

It is also possible to measure at high-temperature, pressures or ex-zones. Therefore SWR can provide special adapters.

## 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. The Doppler effect is used to distinguish if the material is in motion or not. A frequency shift of the emitted pulses indicates a "Flow". If this Doppler shift does not take place, there is no material movement and the sensor indicates a "NoFlow". In the case of a material flow interruption, it is now possible to detect quickly whether there is a problem because the lower screw no longer removes any material or the feed screw no longer supplies material.



## 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.

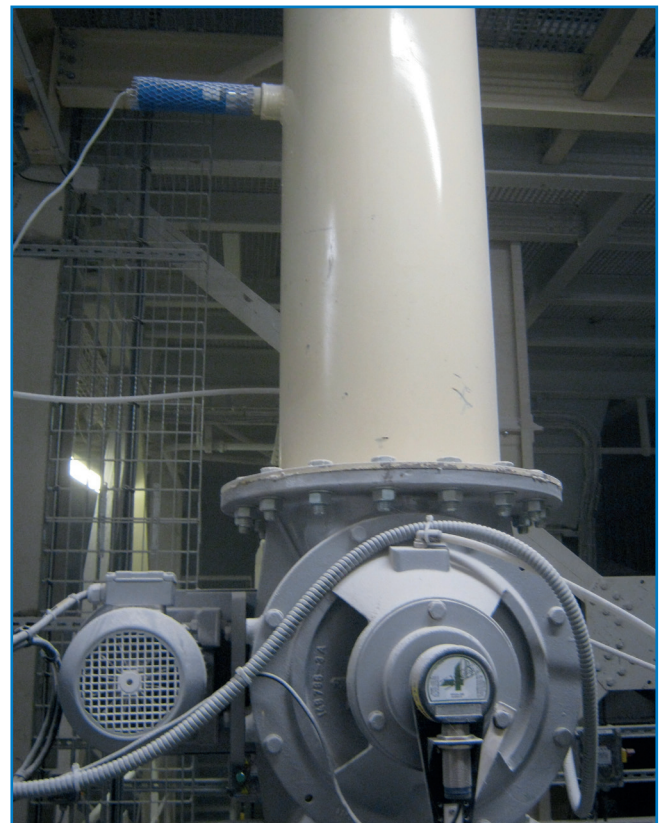
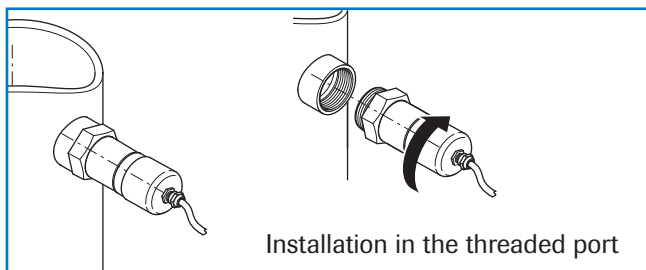


### Material infeed to a rotary feeder

In a lime plant, lime is conveyed into the inlet of a rotary feeder via a vertical downpipe. At this point, it should be ensured that there is always a sufficient material flow. When the material column reaches the sensor position in the fall line, the FlowJam *Plus* signals exactly this state. With this information, the material feed can be controlled better.

## Installation

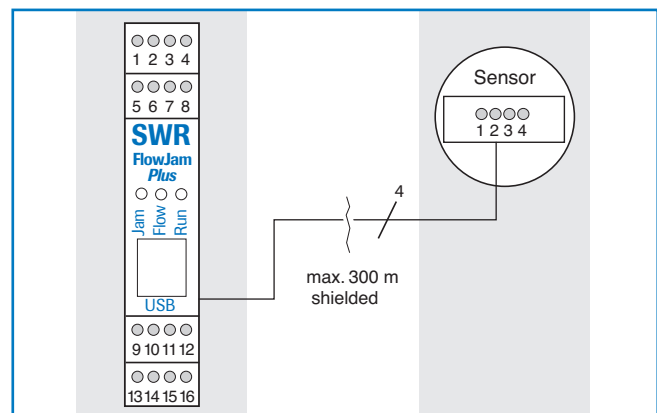
The FlowJam *Plus* sensor is installed on the line using a G 1½-inch threaded port.



## System

A complete measuring point consists of the following components:

- FlowJam *Plus* sensor
- DIN rail connector



| Sensor              |   |
|---------------------|---|
| Housing material    | Stainless steel 1.4571  |
| Protection type     | IP 65   |
| Process temperature | -20 ... +80 °C<br>-20 ... +220 °C (with process adapter)<br>Up to 1000 °C (with ceramic flange) |
| Ambient temperature | -20 ... +60 °C  |
| Operating pressure  | Max. 1 bar<br>Max. 20 bar (with process adapter)  |
| Operating frequency | 24.125 GHz; ± 100 MHz   |
| Transmission power  | Max. 5 mW   |
| Weight              | Approx. 560 g   |
| Dimensions          | Housing: Length 103 mm / Diameter 52 mm<br>Thread: Length 30 mm / Diameter G 1½"                |

| Transmitter (DIN rail) |                |
|------------------------|----------------|
| Power supply           | 18 ... 36 V DC |
| Power consumption      | Approx. 3.5 W  |
| Ambient temperature    | -20 ... +60 °C |
| 2x relay output        |                |
| • Voltage              | Max. 250 V AC  |
| • Current              | Max. 6 A       |
| • Consumption          | Max. 250 VA    |
| Communication          | USB            |
| Weight                 | Approx. 172 g  |



certified according to  
**ATEX**

## Use as process adapter

The FlowJam *Plus* sensor can be used at a pressure of 1 bar and temperatures up to 80 °C, without any special adapter.

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

## Mounting of process adapter

The process adapter is installed in the same way as the FlowJam *Plus*. It is screwed into a G 1½-in threaded port, which is provided by the customer.

The FlowJam *Plus* will be screwed into the internal thread of the adapter.

## Technical data

|              |                                       |  |
|--------------|---------------------------------------|--|
| Material     | Stainless steel 1.4571, POM diaphragm | Stainless steel 1.4571, Peek 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                                  |



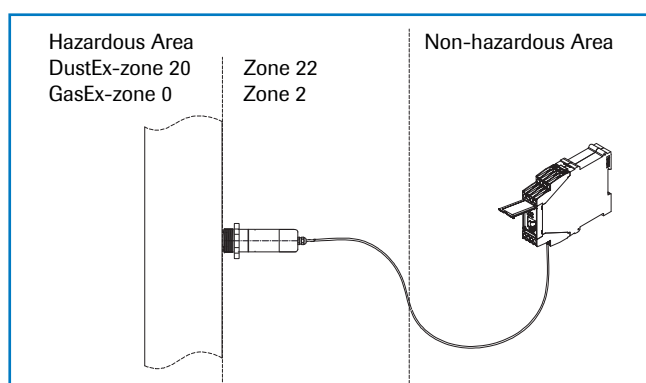
## Use for separation of explosion-areas

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 Peek).

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

- Cat. 1: Dust potentially explosive zone 20 (250 cm<sup>2</sup>)
- Cat. 2: Dust potentially explosive zone 21 (500 cm<sup>2</sup>)
- Cat. 3: Dust potentially explosive zone 22 (unlimited)



As the non-conductive area of the process adapter is 10.75 cm<sup>2</sup> 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.

