MF3000

Mass Flow Measurement for Bulk Materials

MF3000 Mass Flow Meter

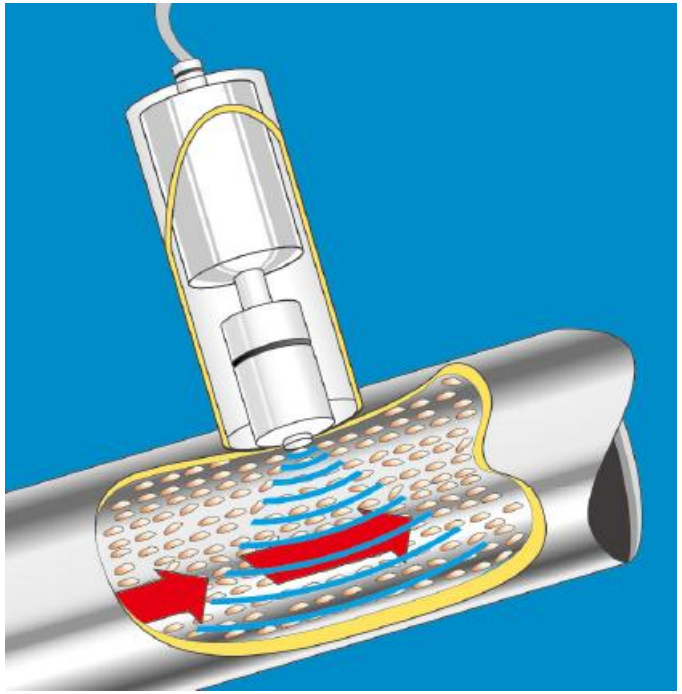
Application and Function

Our solid flow meter MF 3000 is designed for flow measurement in metallic pipes from a few kg/h to many t/h. **The system is suitable for online measurements of powders, dusts, pellets, and granules from 1 nm up to 2 cm in pneumatic or free fall conditions.**

The measurement principle of the MF 3000 is based on the physical **Doppler-Effect,** whereas the sensor generates a uniform field in the **microwave frequency range inside the pipe.** These microwaves are being reflected by particles passing through the pipe.

Calculation of frequency and amplitude changes allows for accurate determination of solid flow. Non-moving particles like dust accumulation are excluded from the calculation.

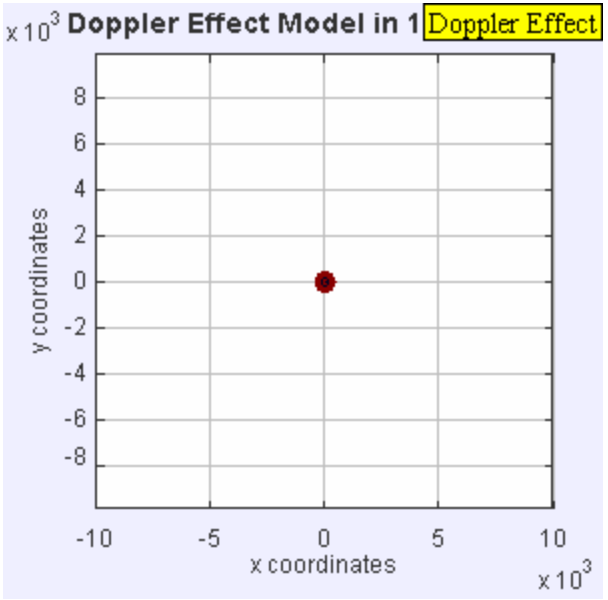
The installation is simple and cost effective via a welded branch, through which the sensor is screwed flush to the inside of the pipe. The sensor is connected to a DIN-rail mounted transmitter with **4...20 mA, RS232 and RS485 output**. The calibration is easy by using our **MF– SMART software** and a reference flow value.

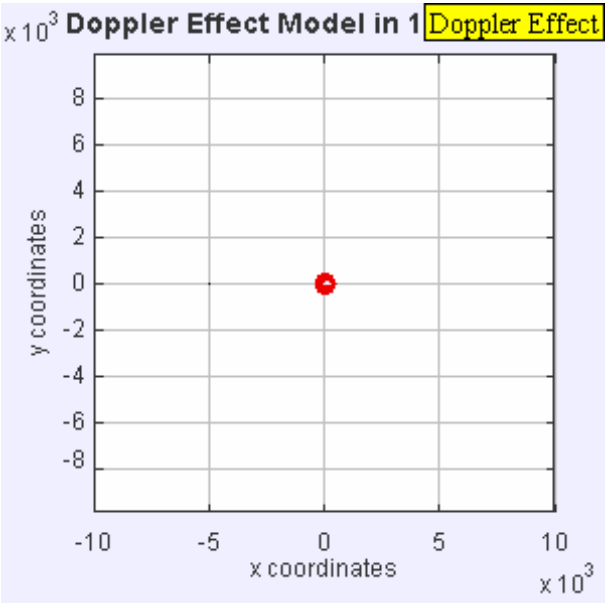


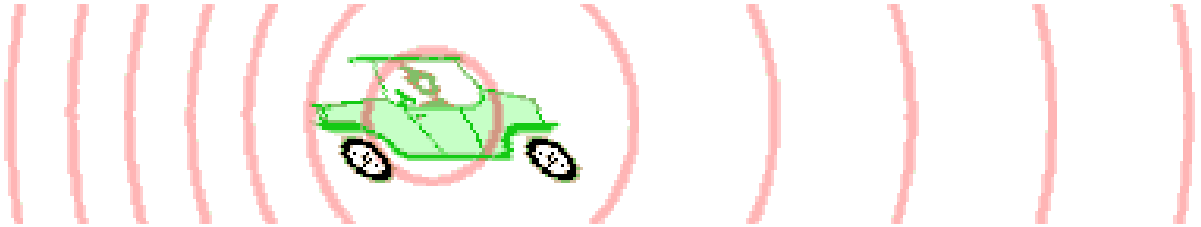
Doppler-Effect

The Doppler effect (or the Doppler shift) is the change in frequency or wavelength of a wave (or other periodic event) for an observer moving relative to its source.

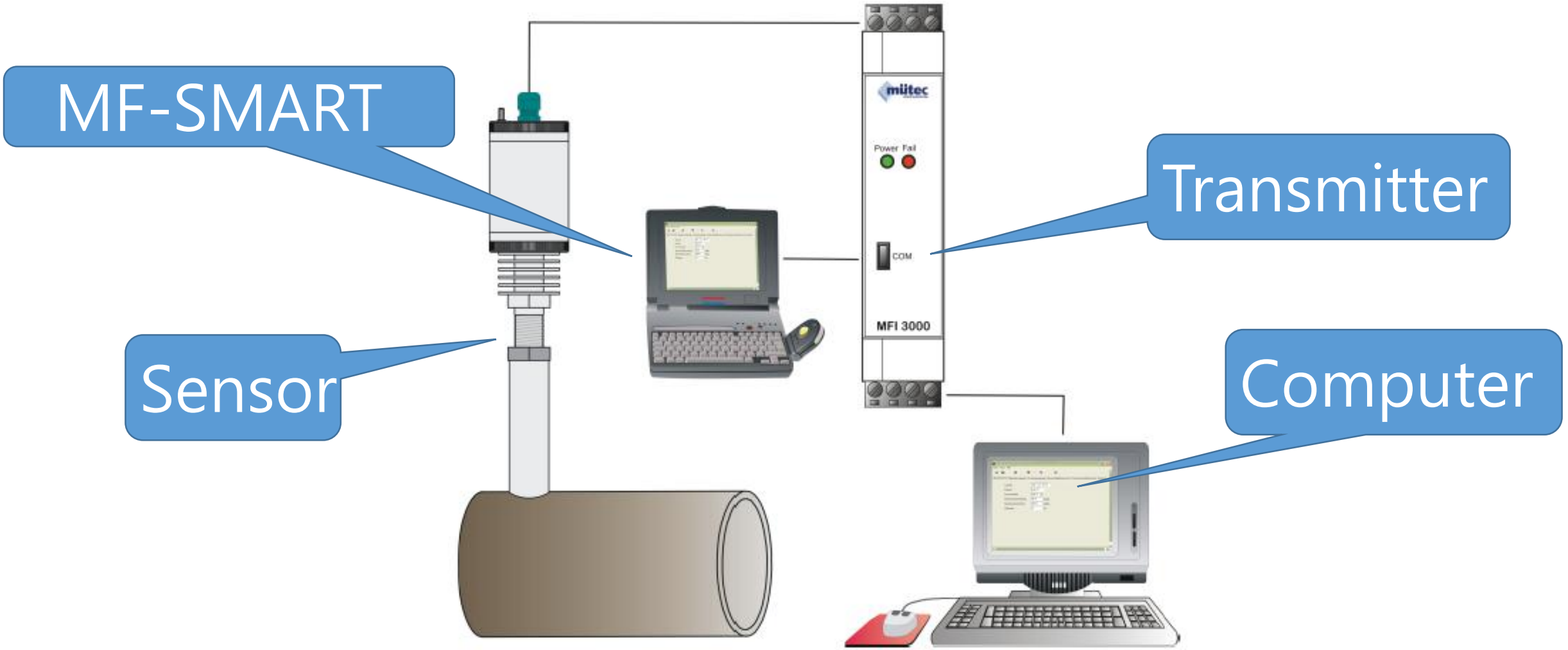
The same sound source is radiating sound waves at a constant frequency in the same medium.
However, now the sound source is moving with a speed.
Since the source is moving, the center of each new wave front is now slightly displaced to the right.
As a result, the wave-fronts begin to bunch up on the right side (in front of) and spread further apart on the left side (behind) of the source. An observer in front of the source will hear a higher and an observer behind the source will hear a lower frequency.





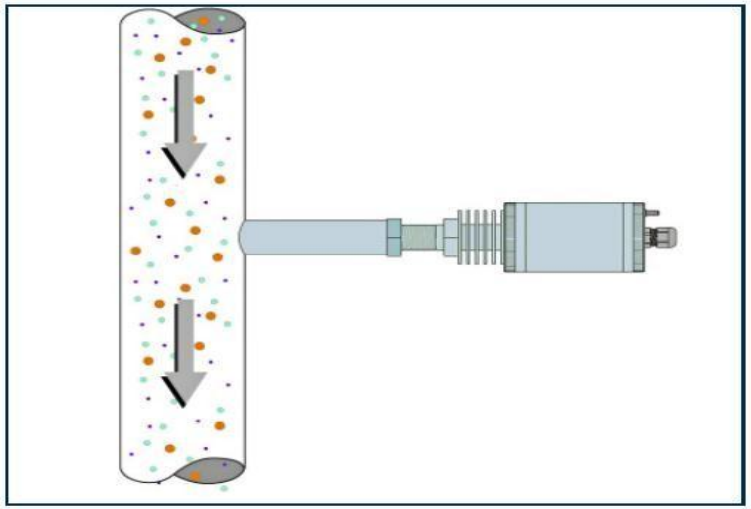


MF3000 Mass Flow Meter-System components



MF3000 Mass Flow Meter-Key Features

Main Benefits



- For pneumatic conveyors and free falling processes
- For all solid materials from a few kg/h to many t/h
- No armatures inside the pipe and inside flush fitting
- Very fast and contactless measurement
- Easy, quick and cost effective installation and start-up
- Galvanic separated DIN-Rail Transmitter with RS232- and RS485-Interface
- Robust stainless steel version, abrasion and maintenance free
- Limit value monitoring with alarm contact
- Sensor-transmitter distance up to 2.000 m
- Easy and quick calibration; Adjustable sensitivity
- Optional: ATEX for Zone 20 and Zone 2

MF3000 Mass Flow Meter

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Measurement start free fall :	About 1 kg/h
Measurement start pneumatic transport	About 1 kg/h
Max. pipe diameter	DN 300(bigger diameter on request)
Particle size	1nm to 20mm
Moisture	Depending on the product
Operating pressure	6 bar
Operating temp.	-20℃~90℃(Option+450℃)

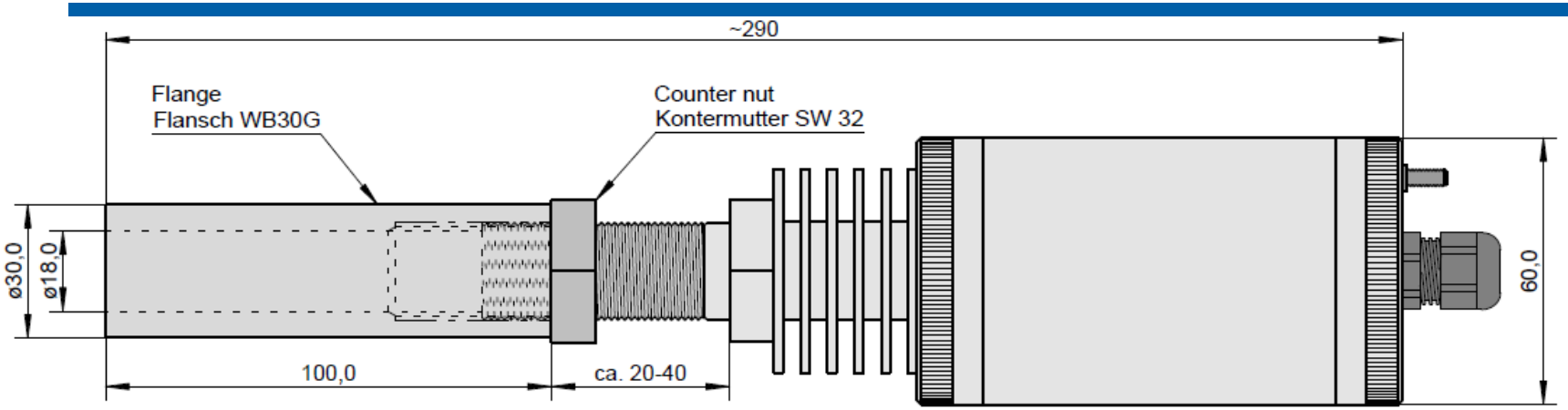
Transmitter

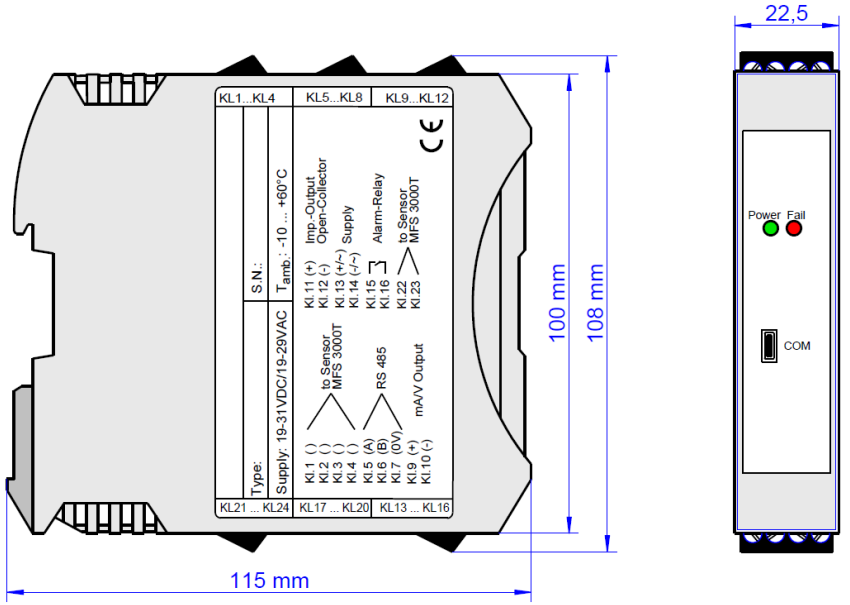
Construction	DIN-Rail, 22,5 mm
Auxiliary energy	24 V AC/DC
Power consumption	2W
Ambient temp.	-10℃~60℃
Protection class	IP30
Output signal	0/4-20/22mA(Max. 750Ω) ; 0/2-10/11V
Interface	RS-232/485

Sensor

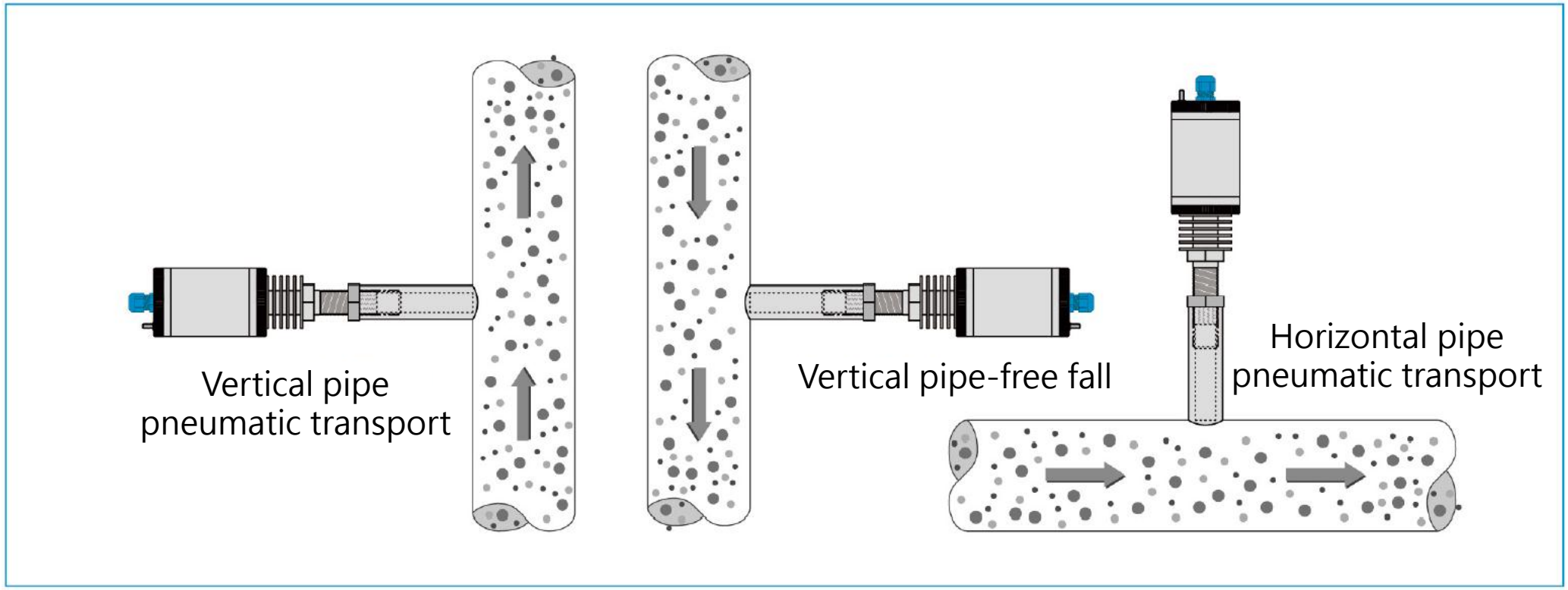
Medium touched parts	3004L
Process connecting	Welding flange
Housing material	304L
Protection class	IP67
Power supply	Via transmitter
Ex-proof (Option)	II 3G Ex nA T4 II1/2 DIP67 T 130℃

MF3000 Mass Flow Meter-Dimensions





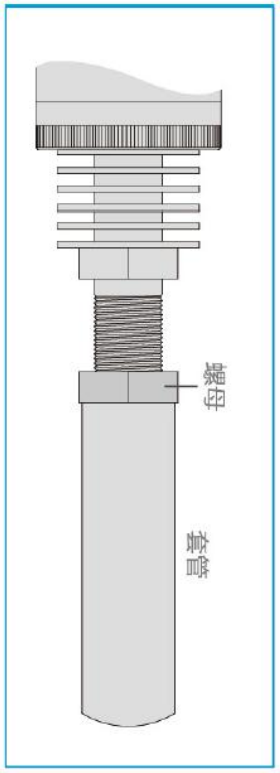
MF3000 Mass Flow Meter-Installation

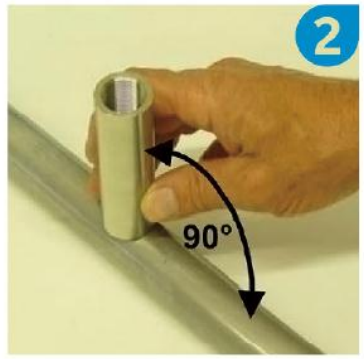


MF3000 Mass Flow Meter-Installation

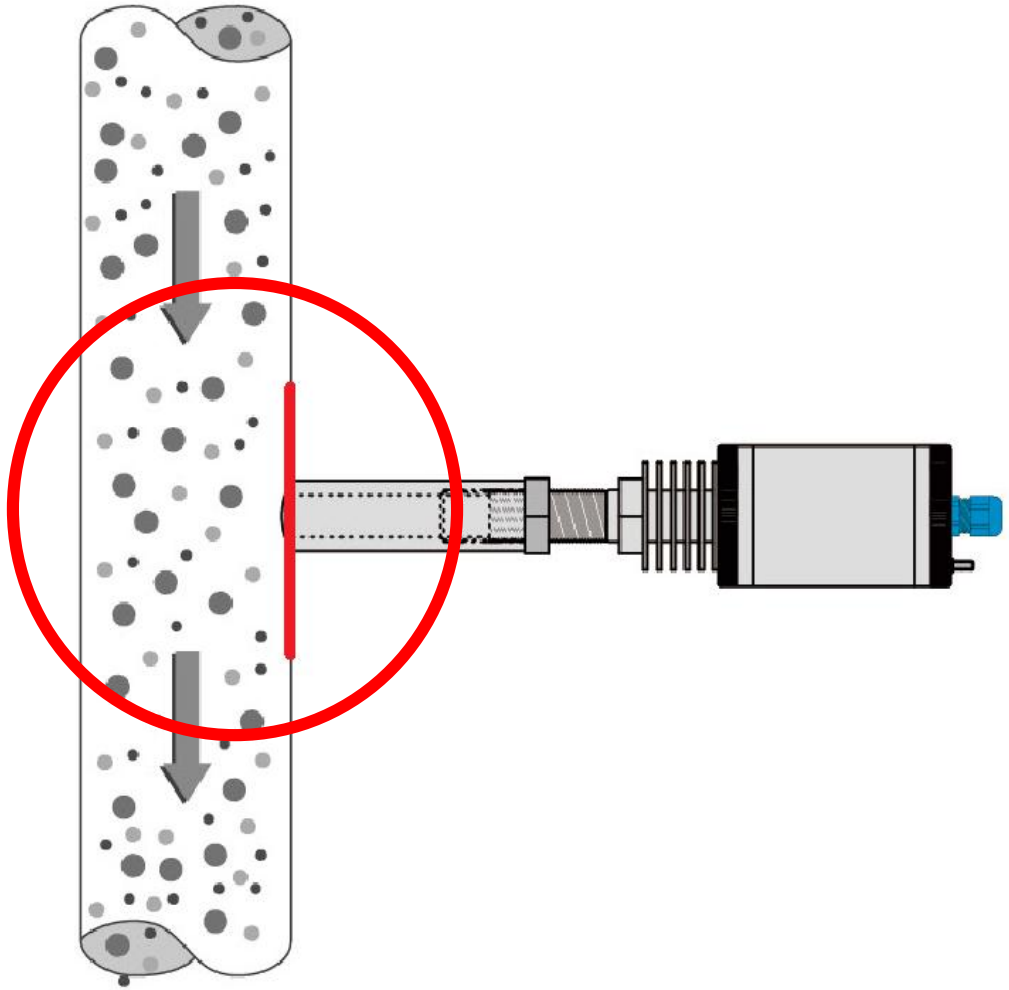
The split between welding branch and pipe wall has to be closed by a weld seam after fixing the flow sensor flange **vertical and in a 90° angle to the pipe axis.**

With a following pressure examination can be checked the quality of the weld seam. For bore out the pipe wall for the necessary measuring window, an 18mm drill is needed. The welding branch which has been welded on before can be used as drilling jig. After bore out the drill hole has to be buried in order to avoid material deposits.



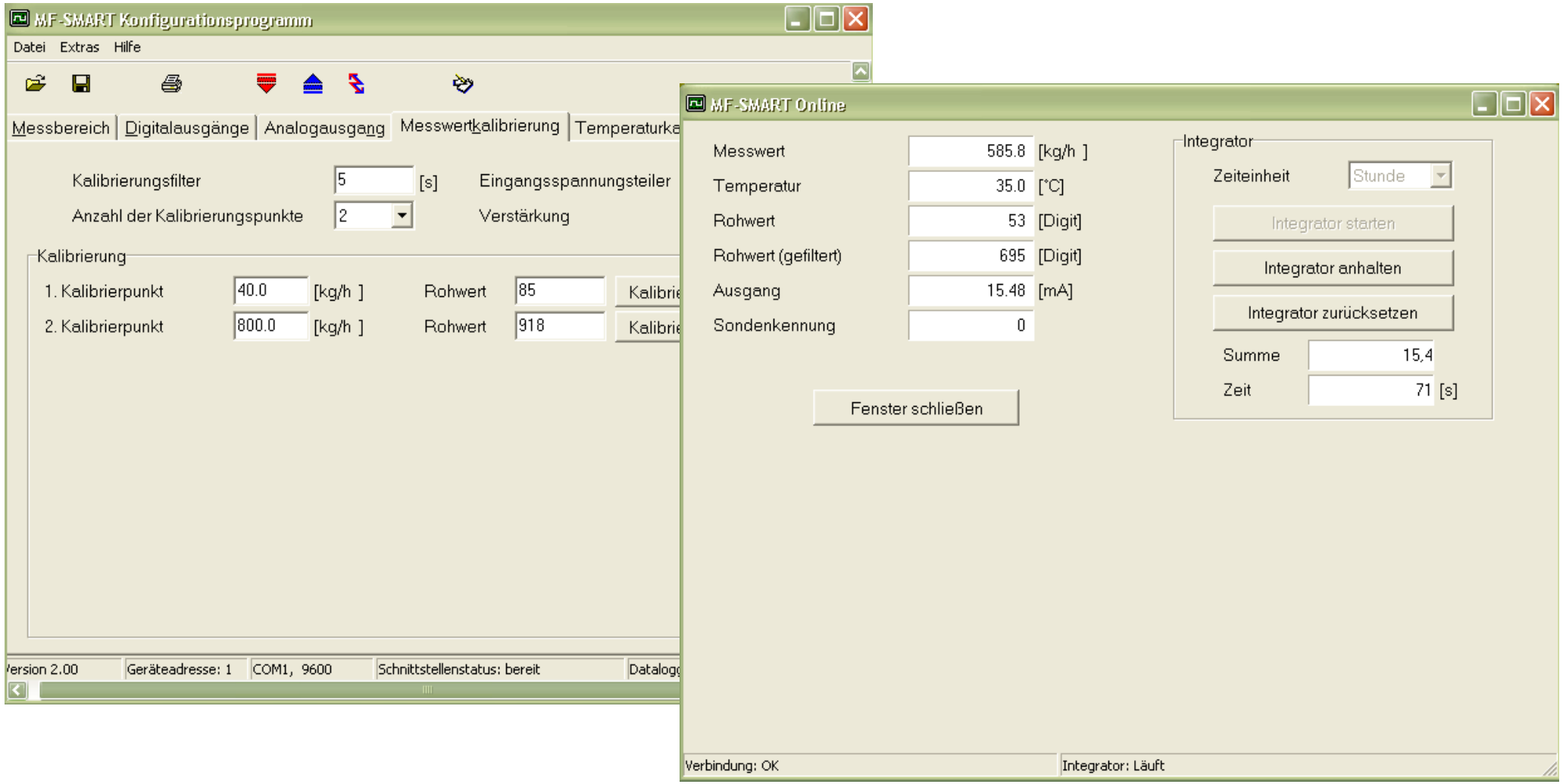


MF3000 Mass Flow Meter-Installation



In a vertical pipe the flange will be placed horizontal and also in the 90° angle to the pipe axis.

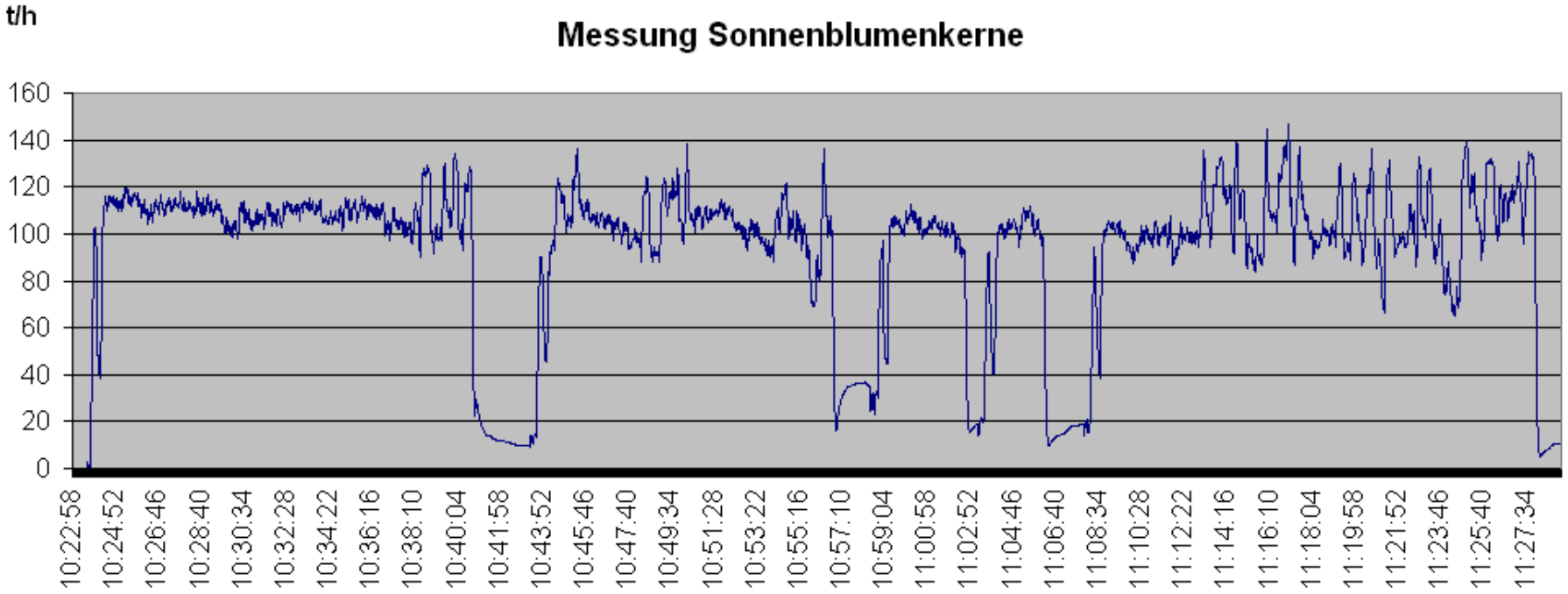
MF3000 Mass Flow Meter-Calibration



MF3000 Mass Flow Meter-Transmission

Won’ t be affected by transmission rate

MF3000 regulate the transmission rate by Doppler-Effect. Even the material transmission speed up, it will regulate the speed accordingly. We adopt “COUNTER” way to calculate the quantity of signal reflex from the particles. Which means we fully use Doppler-Effect for measuring and regulating very well.

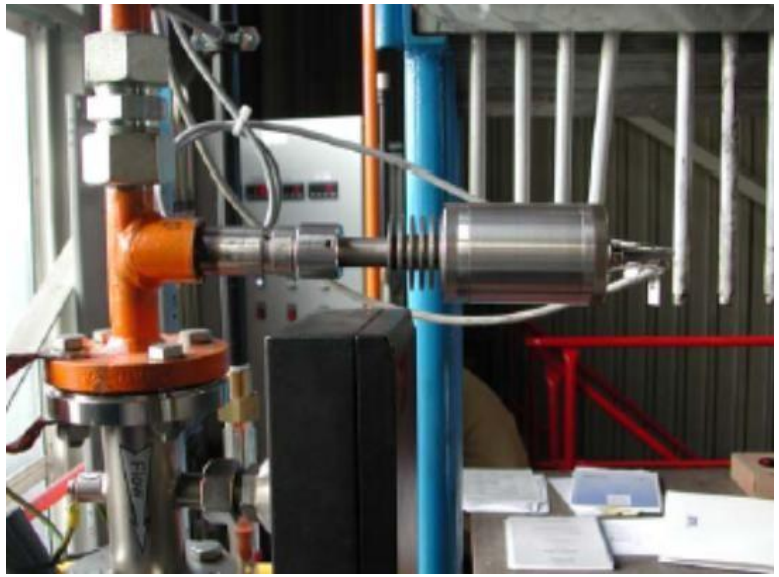


MF3000 Mass Flow Meter-Vertical Pipe Installation

Silicone

Animal Feed

Coal Powder

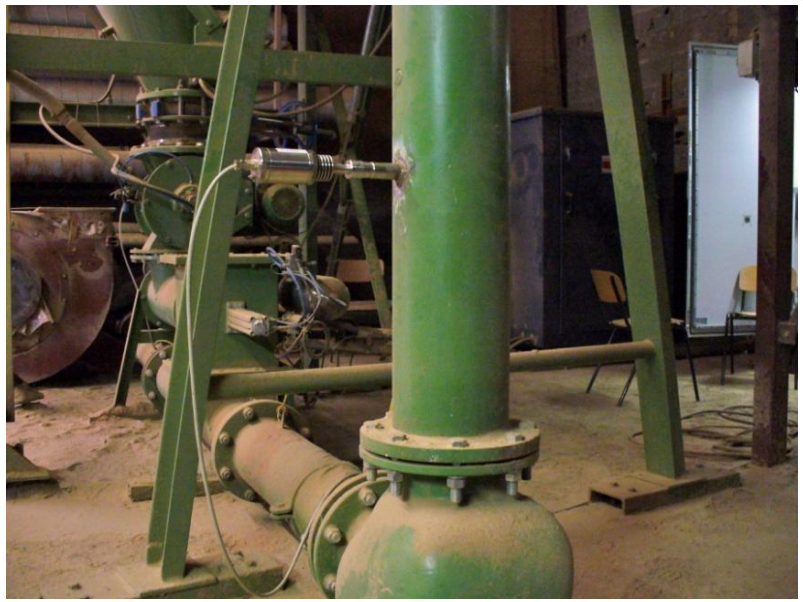


MF3000 Mass Flow Meter-Vertical Pipe Installation

Coal Powder

Cement

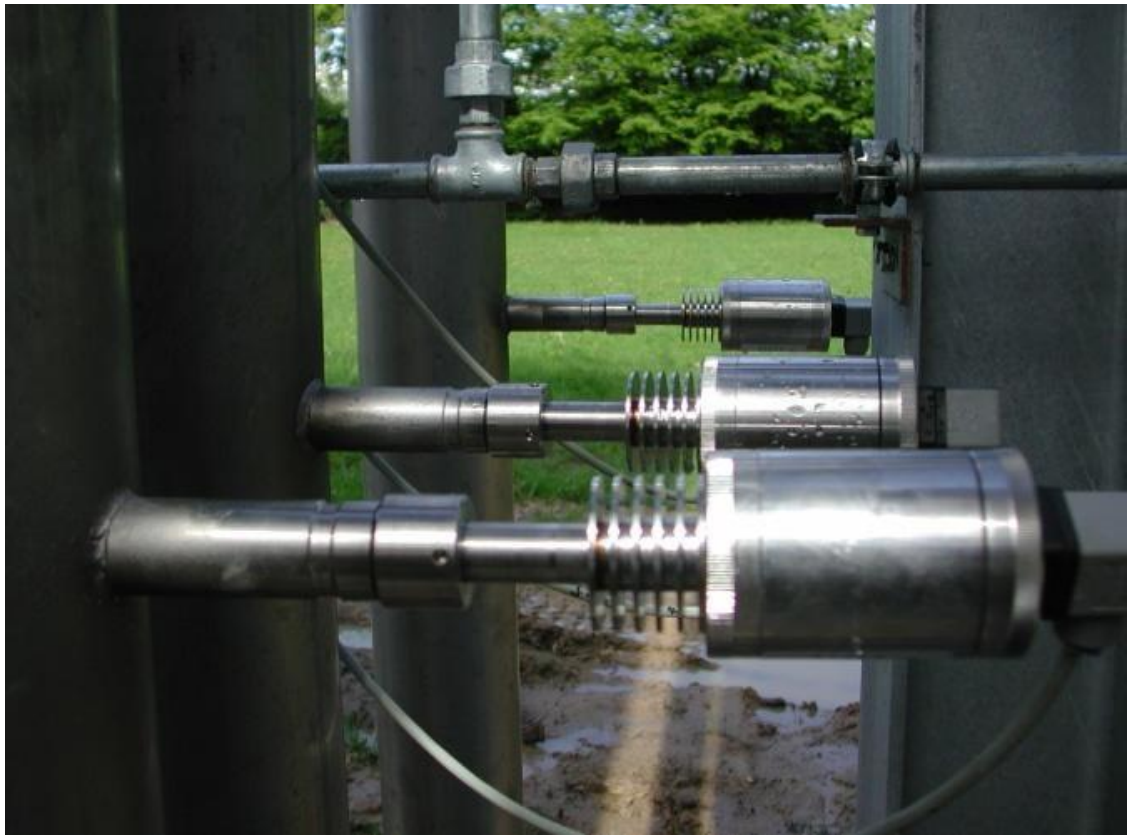
Wooden Dust



MF3000 Mass Flow Meter-Vertical Pipe Installation

Plastic Particles

Cut Tobacco

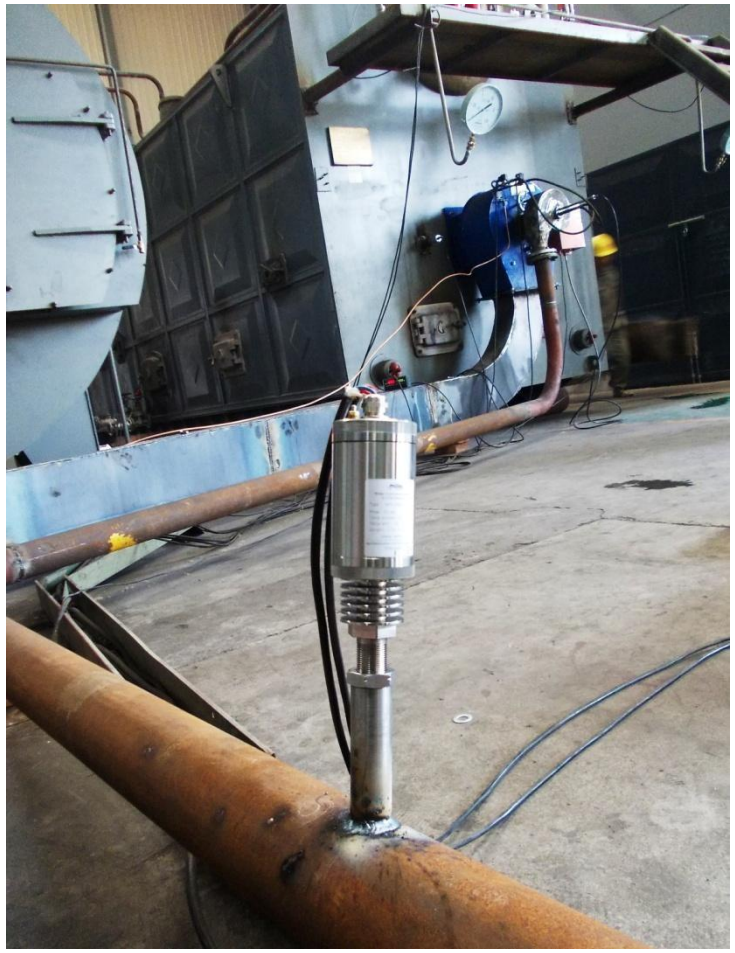


MF3000 Mass Flow Meter-Horizontal Pipe Installation

Coal Powder

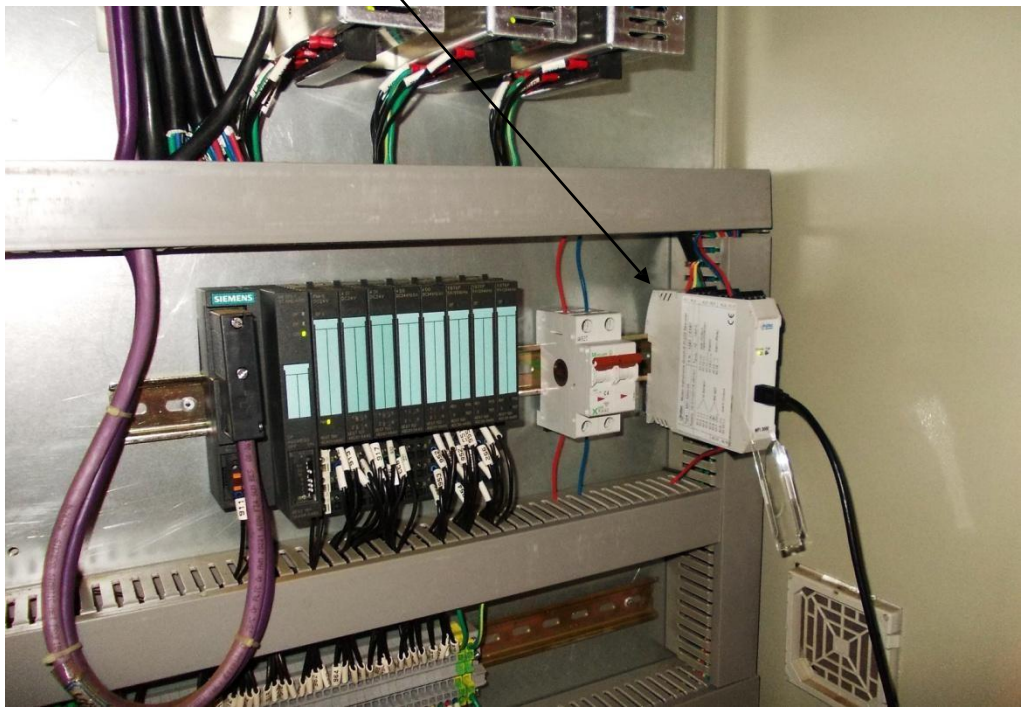
Active carbon

MF3000 Mass Flow Meter-Horizontal Pipe Installation



Coal Powder

Transmitter Installation




Q&A