



MICROWAVE SOLIDS FLOW SENSOR **MWS-DP-2**

With high penetrability of buildup material on the sensing head, this sensor can detect moving material such as powders, granules, etc. by utilizing the Doppler effect.



WIRE AUTOMATIC DEVICE CO.,LTD.

MICROWAVE SOLIDS FLOW SENSOR MWS-DP-2

General

The MWS-DP-2 Microwave Solids Flow Sensor detects moving solids utilizing microwave high penetrability and the Doppler effect.

The sensing head transmits microwaves toward the target material.

A portion of the microwaves are reflected back to the sensing head and analysed as to whether they are from a moving or stationary object.

The highly-penetrable microwave passes through a buildup on the head and even through pipe made of non-conducting materials such as plastics. It is best suited for detecting such materials as powders, granules, etc, moving through a vacuum pipeline.



Penetrability / Doppler effect of microwaves

When microwaves transmitted through the air encounter an object, some will be reflected some absorbed and the rest will pass through the object.

The amount of microwaves that pass through the object depends on the composition of the object encountered.

Generally speaking microwaves cannot penetrate metals and are reflected; water absorbs the most microwaves.

Microwaves can easily pass through plastics, glass, ceramic, paper etc.

On the other hand, when microwaves are transmitted and reflected back to the sensor from a moving object, a frequency shift is generated between the transmitted and the reflected waves by means of the Doppler Principles, which is converted to a motion signal and actuated an output relay. Therefore:

1

All substances other than metals can be penetrated when attached to the sensing surface.

Penetrability depends on the thickness and composition of the attached materials, and the quantity of metallic substances and water contained in said material.

Though microwaves will pass through a non-conducting pipe, take caution to prevent microwave leakage as much as possible so as not to detect unwanted objects within the detecting range.

2

The sensor can be protected from high temperatures and pressures and hazardous materials by using an optional waveguide extension kit.

3

The detecting range can be varied in size, speed, and reflecting ratio, with higher levels of these increasing the detecting range.

4

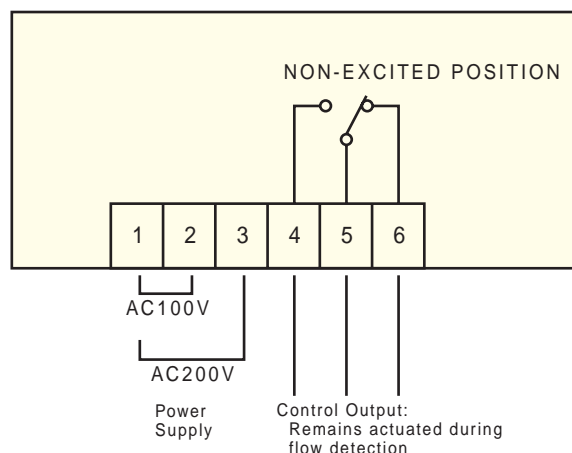
The sensor will err in operation if affected by vibration, or, if moving objects, other than those to be detected, appear in the defecting range.

Therefore, the frequency shift generated by target objects must be bigger than that from non-target objects or that caused by vibration.

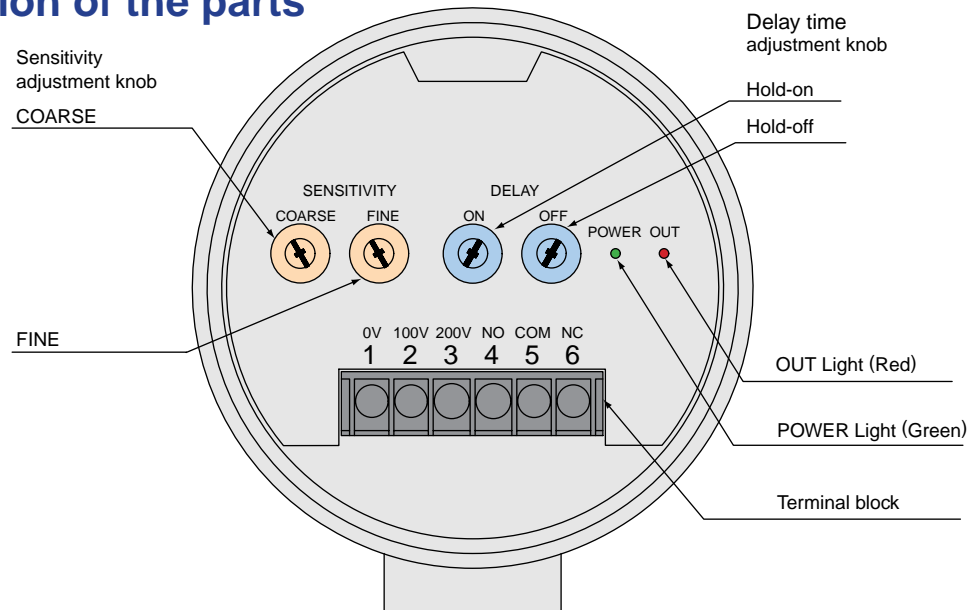
Features

- Minimally affected by dirt and other non-metallic material on the sensing head, steam and airborne particles.
- Can be used in such adverse conditions as high temperature and high pressure, and can also detect hazardous materials. A waveguide extension kit is optionally available for this purpose.
- Mounted flush, no intrusion or damage to material flow.
- Flexibility of installation because of microwave's wide directional angle.
- Can be powered by commercial power supply (AC100V/200V).
- Built-in amplifier enables easy installation and wiring; lightweight and compact.

Wiring



Description of the parts



Adjustment

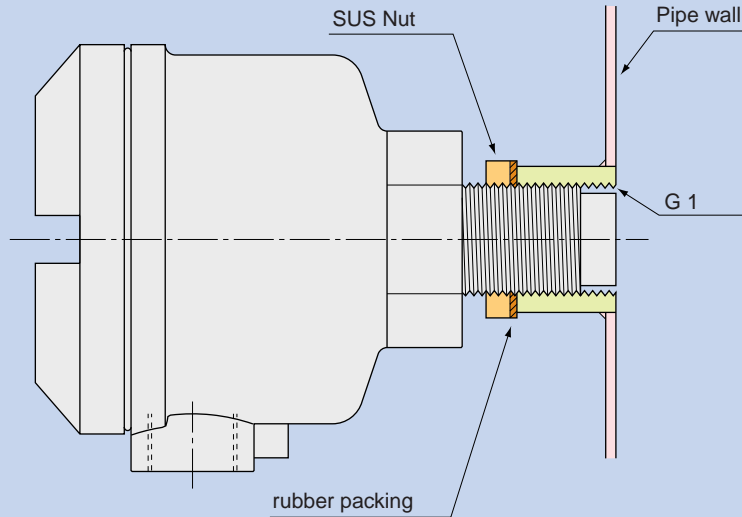
After finishing the installation and wiring, check the following and adjust the sensitivity.

- Upon turning on the power supply, the POWER light (Green) will come on.
- Turn the delay time adjustment knobs HOLD ON and HOLD OFF counterclockwise, set them at minimum position.
- Turn the sensibility adjustment knobs COARSE and FINE clockwise and set them at maximum position.
- Confirm the actuating light OUT is off while operating the pipeline with an EMPTY or BLOCKED condition.
In case of the actuating light OUT coming on, turn the sensitivity adjustment knob COARSE counterclockwise, slowly and find a point where the actuating light OUT goes off.
This is the noise actuating point.
- While operating the pipeline with a continuous flow to be detected, you can see the actuating light change to "come on".
Turn the sensitivity adjustment knob COARSE further counterclockwise slowly and find a point where the actuating light OUT goes off.
This is the true actuating point.
- Set the sensitivity adjustment knob COARSE midway between the noise actuating point and the true actuating point.
- In order not to detect a sporadic flow, set the non-detecting limit with the HOLD ON delay adjustment knob.
- In order to detect a sporadic flow; set continuous detecting limit with the HOLD OFF delay adjustment knob.

Specifications

Type designation	MWS-DP-2
Detecting method	Utilizes the Doppler Principle for detecting moving material
Power supply	AC100V/200±10% 50/60Hz
Operating distance	Up to 1.5m (Depending on material)
Frequency/Transmitting power	24.2GHz/5.5mW
Control output	One transfer delay contact AC250V 3A(cosØ=1) Remains actuated during flow detection
Delay function	Hold-on delay; 0.1-10 seconds (adjustable) Hold-off delay; 0.1-10 seconds (adjustable)
Delay time from power on to function	Approx. 8 seconds
Power consumption	5VA
Noise tolerance	Square wave, noise from noise simulator (Rising time: 1 nanosecond, Width 1 microsecond) ±1.5KV(Normal and common mods), With the frequency of the power supply in the 0-360° phase.
Operating ambient temperature	-10°C to +55°C
Non-functioning temperature	under -20°C or above +70°C
Continuous maximum pressure	5kg/cm ²
Enclosure	Cast aluminium, Metallic silver gray, water tight
Weight	1.2kg

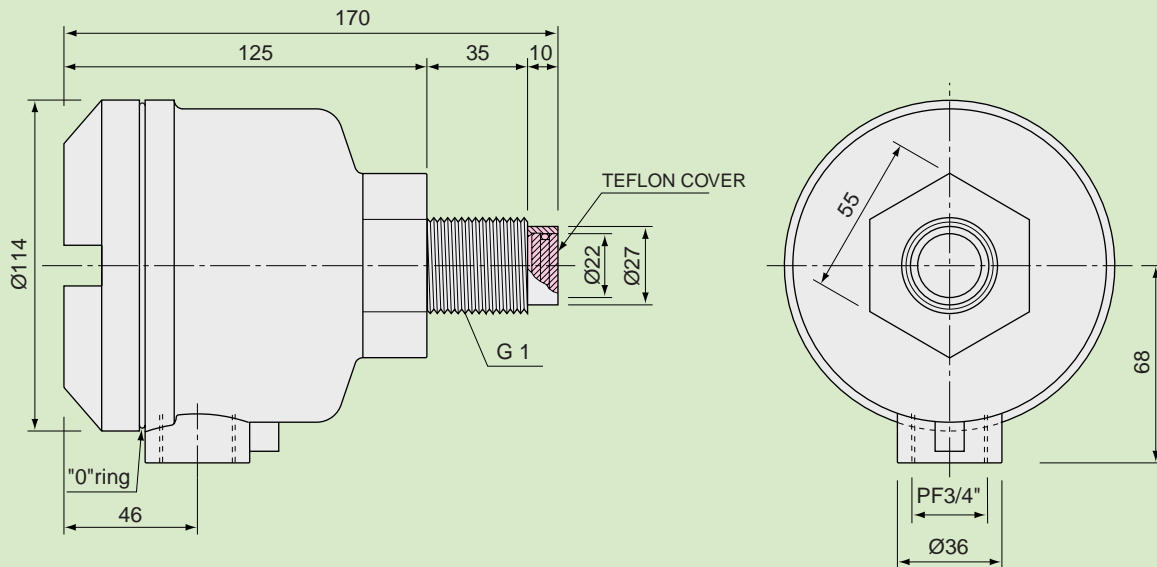
Installation



Notes:

- Apply liquid RTV rubber into screw and any gaps.
- Equipped with a SUS nut and rubber packing.

Dimensions



This specification may be changed without notifying the buyer.



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