

ProGap

Microwave barrier



Operating Instructions



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1. General Comment

The radar barrier is a contactless measuring method and can be used for metallic as well as non-metallic ducts, bunkers, shafts, free-falling stretches, expansion bellows etc. Since it can penetrate non-conductive material, e. g. such as plastics, it is possible to detect from the outside or through a window. The metering thus can be completely decoupled from the process, e. g. for measuring aggressive, abrasive or bulky material.

Even at difficult conditions - like temperatures of up to 1000 °C, pressure of up to 20 bar or all dust Ex-zones - the ProGap can be used by means of a process adapter.

2. Mounting and Installation

The fitting position of the devices is arbitrary, however, absolute attention must be paid to the same fitting position of transmitter and receiver (marking of each device at the top) and to the very exact justification to each other (see below fig.).

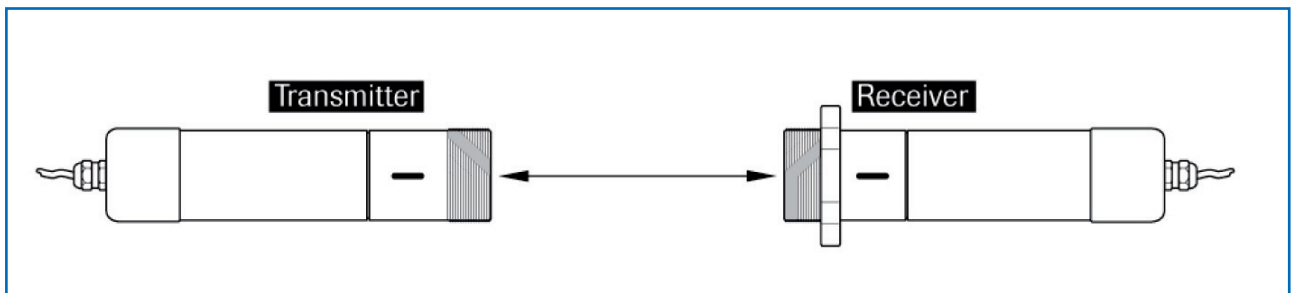
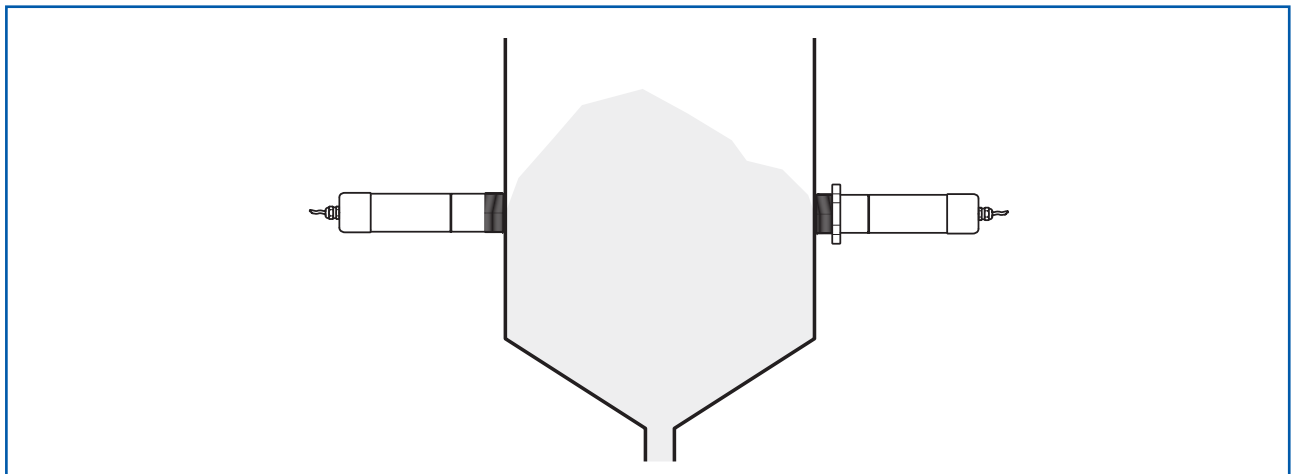


Fig. 1: Installation

Transmitter and receiver must face each other with their front side on the same level.



Finally, it is important that the ProGap is mounted in a place where there are no or only very weak vibrations.

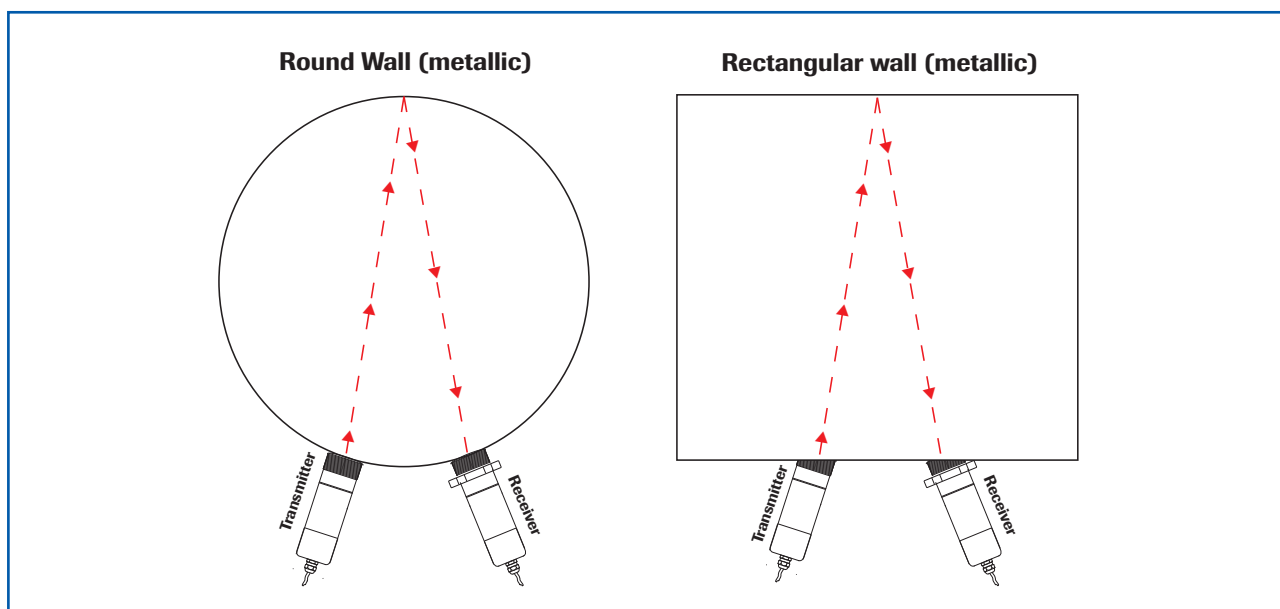
To detect levels of materials with low bulk density respectively with a low dielectric coefficient reliably, the installation of transmitter and receiver can be done as shown in the drawing below.

In this type of installation the metallic wall on the opposite side of the bin can be used for the reflection of the microwave.

The arrangement of transmitter and receiver mustn't be exactly parallel to each other in this installation, because in that case the signal of the transmitter is not reflected to the receiver. The installation should be slightly angled.

According to the rule arriving angle = emergent angle a slightly angled positioning, depending on the distance to the opposite wall, is necessary.

The distance covered by the microwave in the shown installation is nearly twice as long as it is in a face to face installation. The installation of the equipment on one side of the bin is also an advantage in case of shortage of space.



3. Electrical Connection

The connection of the sensor has to be carried out according to below figures.

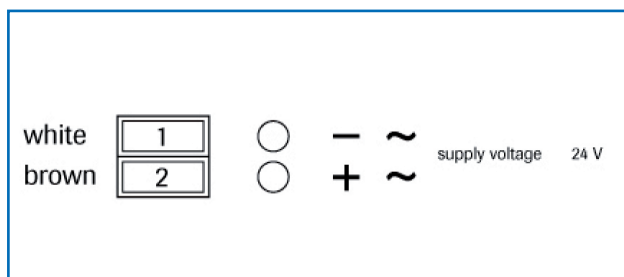


Fig. 2: Transmitter

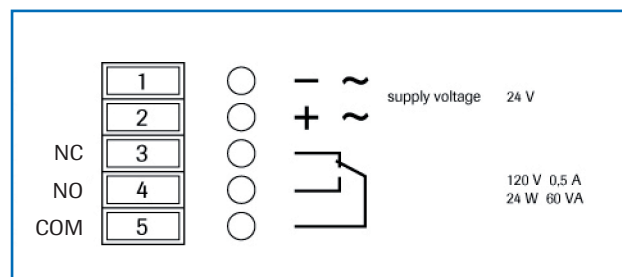


Fig. 3: Receiver

For the 2-wired connection to the transmitter a current installation cable can be used.

4. Safety

The ProGap was designed, built and tested to be safe and was shipped in safe condition. Nevertheless persons or objects may be endangered by components of the system if these are operated in an inexpert manner. Therefore the operational instructions must be read completely and the safety notes must be followed.

In case of inexpert or irregular use, the manufacturer will refuse any liability or guarantee.

4.1 Regular Use

- Only original spare parts and accessories of SWR engineering must be used.

4.2 Identification of Dangers

- In the manual it is pointed out to possible dangers with the use of the microwave barrier.

4.3 Operational Safety

- The microwave barrier must be installed by trained and authorised personnel only.
- In case of maintenance-work on the pipe or on components of the ProGap-sensor, make sure that the piping is in unpressurized condition.
- Switch off the supply voltage for all maintenance, cleaning or inspection works on the tubes.
- Before sweat works the microwave barrier must be removed.
- The components and electrical connections must be checked for damages regularly. If a damage is found, it is to be repaired before further operation of the instruments.

4.4 Technical Progress

- The manufacturer reserves the right to adapt technical data to the technical progress without particular advance notice. If you have any questions, SWR engineering will be pleased to inform you on possible changes and extensions of the operating instructions.

5. Commissioning

All necessary control elements for the alignment are in the receiver.

P1: Adjustment of the sensitivity

P2: Adjustment of the time delay of the signal.

S1: Doubling of the sensitivity
(Pos. 1 = normal sensitivity and
Pos. 2 = double sensitivity)

LED red: the flashing shows the signal intensity.

- fast flashing = high signal intensity
- slow flashing = low signal intensity
- LED out = no signal received

LED green: indicates the switching status of the relay.

- LED on = relay closed

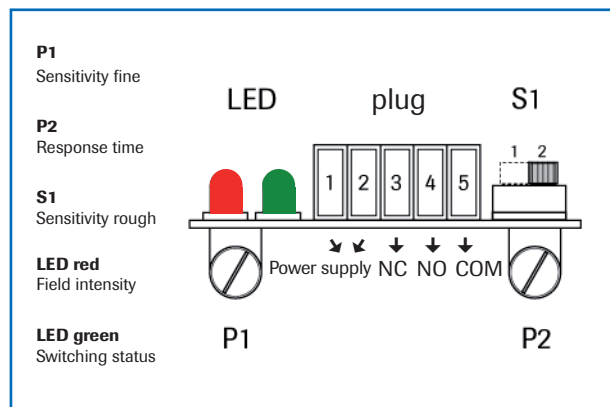


Fig. 4: Receiver

Adjustment of the signal threshold with Potentiometer P1

With the potentiometer P1 the signal threshold can be adjusted, to that the relay should switch.

The microwave barrier is adjusted in such a way that clear distinctions between interrupted or damped resp. not-interrupted microwave beam are made.

Proceeding: With not-interrupted beam and **flashing red LED** turn P1 against the clockwise to the relay switches and at the same time the LED shines green. Now interrupt the beam path (put the material to be detected between the transmitter and the receiver) and turn P1 only so far clockwise until the green LED goes out. Repeat this procedure. If the green LED still lights, even with a complete left turn of P1, and furthermore the material has a low dielectric constant and weak damping (e.g. paper, plastics, foams, etc.), please contact SWR engineering GmbH

If the red LED should not light, put the switch S1 to position 2, with it the delicacy is doubled.

If the LED does not light even in this most sensitive position, then the receiver does not get any signal from the transmitter. In this case examine the microwave barrier for faultless function by clarifying the following possibilities:

- Wrong adjustment of the barrier to each other
- The distance between transmitter and receiver is too large
- Too much damping material in the beam path
- Damping built-up at the sensors

Adjusting of the switch response time Potentiometer P2

Finally adjust the switch response time with the potentiometer P2 according to your requirement between the range of 0.25 and 5 seconds. By turning P2 anticlockwise, the delay increases. Thereby a fluttering of the relay can be stopped, which have been produced by critical adjustment of the sensitivity.

6. Trouble Shooting

If the green LED should not light even in the most sensitive setting (potentiometer P1 turned completely to the right and switch S1 on the position 2), when there is material between the transmitter and the receiver, it could be possible that the maximal detecting range is limited due the following:

- The position of the installation places to each other
- The position of transmitter to receiver
- The distance between transmitter and receiver is too large

7. Notice

- Avoid reflections on metallic parts

8. Declaration of conformity

The called product agrees with the regulations of the following European directives:

Number: 89/336/EWG

Text: Electromagnetic Compatibility

The correspondence of the called product with the regulations of the directive No. 89/336/EWG is proved by the entire observance of the following norms:

Ref. No.	Date	Ref. No.	Date
DIN EN 55011	2007	DIN EN 61000-4-3	1997
DIN EN 61000-1		DIN EN 61000-6-1	2002
DIN EN 61000-3-2	2001	DIN EN 61000-6-2	2000
DIN EN 61000-3-3	2001	DIN EN 61000-6-3	2002

9. Technical Data

Material	Housing: Stainless steel 1.4571 Sensor-Isolation: POM
Protective system	IP 65; DustEx (optional)
Working temperature (Process temperature)	-20 ... +80 °C -20 ... +220 °C (with process-adapter) Max. 1000 °C (with ceramic-flange)
Ambient temperature	-20 ... +60 °C
Working pressure	Max. 1 bar Max. 20 bar (with process-adapter)
Detection range	0 ... 4 m 0 ... 18 m > 18 m (on demand)
Power supply	24 V DC (-10 / +15 %) 24 V AC (-10 / +15 %)
Power consumption	approx. 1.8 VA
Current consumption	max. 100 mA
Relay output (max.) • voltage • current • capacity	120 V AC / DC 1.25 A 150 VA, 50 W
Response time	0.25 s ... 5 s (continuously adjustable)
Measuring frequency	K-Band 24.125 GHz / ± 100 MHz
Transmitting power	max. 5 mW
Weight	Transmitter 1.1 kg Receiver 1.1 kg