Micatrone®

Installation & Mounting manual

Mounting instruction for O2-probe (oxygen sensor)

MG-4000-R2/S

mi-280gb / 2010-04-12

Mounting

When installing the probe it is important to select correct placement. It should be easy to remove the probe from the flue gas duct and easy to connect the signal cable between the probe and the central unit.

1. Fit a 3/4" union on the flue duct after the boiler. Make sure the union extends outside of the insulation to facilitate installation of the probe. The probe should be installed at a 15° angle to the horizontal plane, so that the tip of the probe points slightly downward (see figure 2), alt. top mounted (see figure 3). This is to protect the probe from condensation water.
2. Always install the supplied radiation protection on the probe's insertion tube to prevent the sensor's electronics from overheating. Sole use of the radiation protection is not recommended, the flue gas duct should also be insulated.
3. The probe should be inserted so far that at least 10 cm of the tube hangs free inside the duct. This is so the tip of the probe is not cooled via the union.
4. The supplied warning label concerning precautions that should be taken when the boiler is swept must be set up where it is fully visible.

Galvanic isolation

The O_2-probe should always be mounted using the attached compression fitting which is fitted with a isolation socket made of PTFE (TEFLON ®) to seperate the probe galvanically from protective earth (ground) in the boiler/flue-gas duct which could interfere with the measuring. Check that no electrical connection is between the probe and boiler/duct by measuring the resistance between them both.

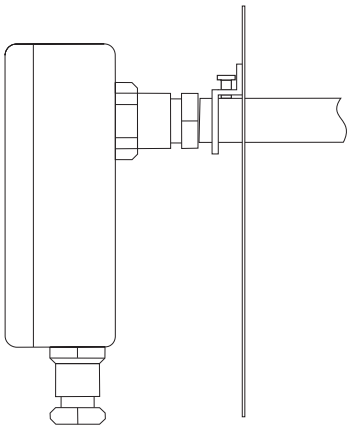

Fig 1, Radiation shield for connection box

Warning against dry-firing!

When "dry-firing" a biomass-fired boiler, the probe must not be placed in the flue gas duct.

NOTE! The measuring probe connection box should not be exposed to tempertures above 60 °C and must therefore be protected against the radiation heat caused by the flue gas duct or the boiler. Good insulation of the flue gas duct and enough space between the insulation and the probes connection box is important. Always use the attached radiation protection shield and make sure of the galvanic isolation.

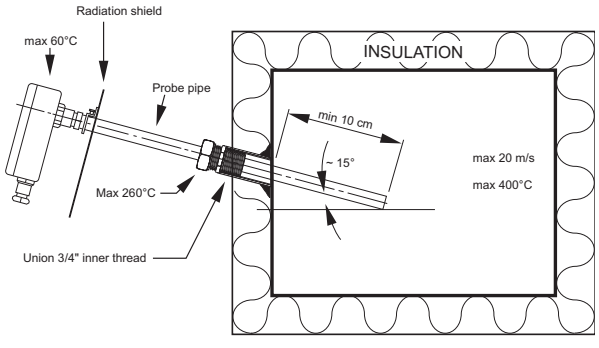

Figure 2
Side mounting of the probe

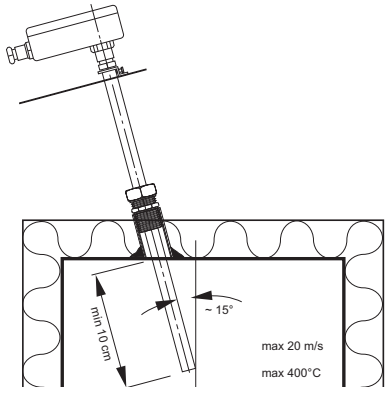

Figure 3
Top mounting of the probe

Wiring

The cable between the probe and the central unit must NOT be extended. Leave an "eye" on the cable by the probe so that the probe can be easily removed from the flue gas duct for calibration and duct sweeping.

The cable between the probe and the central unit and cables to analogue output signals and data communications must be screened for the best measurement result. The screen must be connected to the ground rail in the central unit

Probe

NOTE! The probe must be operational (voltage fed) and always maintain the operating temperature if it is installed in the flue gas duct, irrespective of whether the boiler is operational or not. When the probe is not in use is should be kept in the surrounding air. Wipe the probe dry if it is moist before insertion

Technical data

Temperature range for flue gases:	0...400 °C
Flue gas velocity:	max 20 m/s
Ambient temperature for connection box:	0...60 °C
Max. temperature at the compression fitting:	260 °C
El. connections:	1.5 mm^2/term.
Cable entries:	1 hole ø 20 mm
Cable to central unit:	FKAR-G 10x0,5 mm^2
Cable length:	max 10 m
Degree of protection:	IP 65
Material insertion tube:	Stainless steel
Material connections box:	Aluminium
Duct fitting:	G 3/4"
Weight	1,5kg

Dimensions

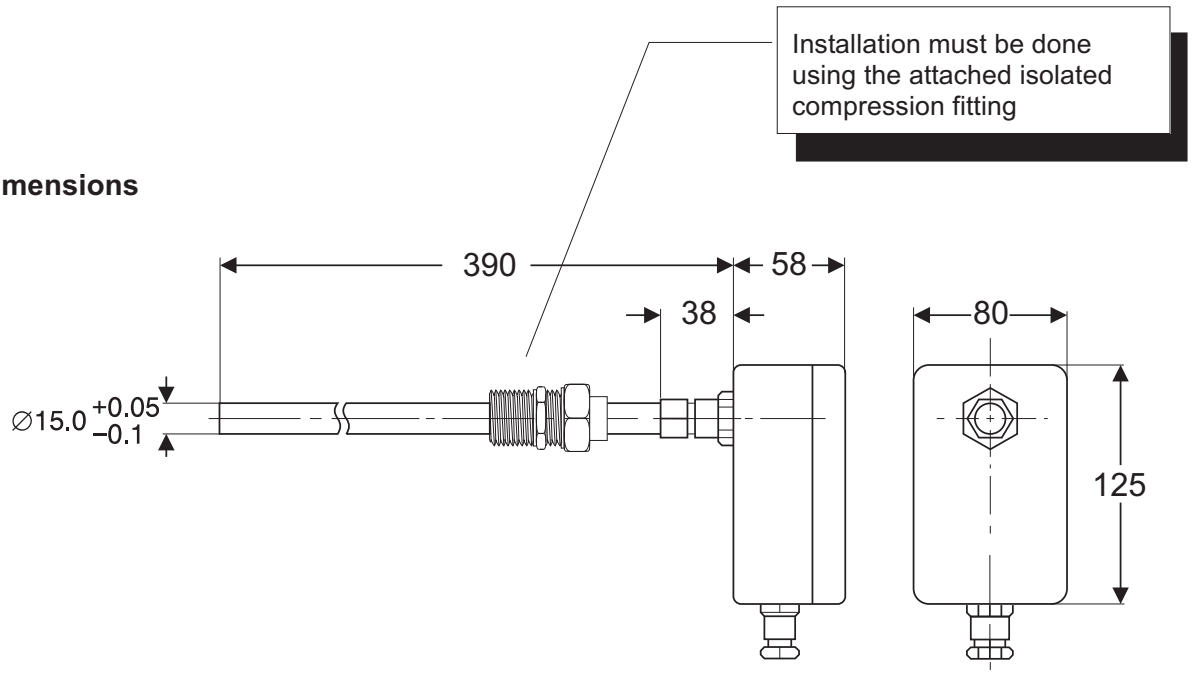

Figure 4
Dimensions O2-sensor MG-4000-R2/S

Oxygen Sensor Cross Sensitivity with other Gases

Cross sensitivity with other gases:

The oxygen sensor measures partial oxygen pressure. Gases or chemicals that will have an influence on the life of the sensor or on the measuring results are:

Combustible Gases

Small amounts of combustible gases will be burned at the hot Pt-electrode surfaces or Al_2O_3 filters of the sensor.

In general combustion will be stoichiometric as long as enough oxygen is available, the sensor will measure the residual oxygen pressure. Investigated were:

- H_2 (Hydrogen) up to 2%; stoichiometric combustion
- CO (Carbon Monoxide) up to 2%; stoichiometric combustion
- CH_4 (Methane) up to 2.5%; stoichiometric combustion
- NH_3 (Ammonia) up to 1500 ppm; stoichiometric combustion

Heavy Metals

Vapours of metals like Zn (Zinc), Cd (Cadmium), Pb (Lead), Bi (Bismuth) will have an effect on the catalytic properties of the Pt– electrodes. Exposures to these metal vapours has to be avoided.

Halogen and Sulphur Compounds

Small amounts (< 100ppm) of Halogens and/or Sulphur compounds have no effect on the performance of the oxygen sensor. Higher amounts of these gases will in time cause readout problems or, especially in condensing environments, corrosion of sensor parts. Investigated gases are:

- Halogens, F_2 (Flourine), Cl_2 (Chlorine)
- HCL (Hydrogen Chloride), HF (Hydrogen Fluoride)
- SO_2 (Sulphur Dioxide)
- H_2S (Hydrogen Sulphide)
- Freons
- CS_2 (Carbon Disulfide)

Reducing Atmospheres

Long time exposure to reducing atmospheres may in time impair the catalytic effect of the Pt-electrodes and has to be avoided.

Others

- Vapours (organic silicone compounds) of RTV (Room Temperature Vulcanised) rubbers are well known pollutants of zirconia based oxygen sensors. The organic part of the compound will be burned at hot sensor parts, leaving behind a very fine divided SiO_2 (Silicone Dioxide/Silica). This SiO_2 completely blocks the pores and active parts of the electrodes. If RTV rubbers are used we advise to use high quality, well cured.
- Dust. Fine dust (Carbon parts/soot) might cause clogging of the porous stainless steel filter and might have an effect on the response speed of the sensor.
- Heavy Shocks or Vibrations might alter sensor properties.
- Water vapour. Condensing water vapour might cause clogging of filters or internal corrosion of sensor parts. We advise to keep the sensor at operating temperature or standby temperature when exposed to exhaust gases. Direct exposure to water droplets has to be avoided.

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