

Technical Advisory

Soldering Nickel/Kovar Pins of TGS Gas Sensors

By keeping in mind the following basic points, you should be able to successfully solder the pins of TGS gas sensors:

1. Sensor Storage

When stored unprotected and exposed to the air for a long period of time, the surfaces of both the nickel and kovar pins of TGS gas sensors are likely to become coated with oxides, making soldering difficult. To minimize this problem, sensors should be stored in a plastic bag and in clean air.

Sensors stored for a long period of time and/or sensors which were tested with corrosive gases are likely to have their pin surfaces coated by oxides. To eliminate this problem, pin surfaces should be polished with an emery cloth before soldering.

2. Manual Soldering

Manual soldering is advised not only to protect the sensor from the adverse influence of chemical vapors such as flux, but also to provide visual assurance that the operation has been performed properly.

3. Recommended Materials

Solders composed of Sn63 : Pb37 (or Sn60 : Pb40) with non-chloric resin flux (JIS: AA Grade or MIL: RMA Grade; ex. Almit KR-19) are suggested for both nickel and kovar pins due to their durability.

A flux of mildly activated resin (e.g. pine resin in which a small quantity of inorganic flux is mixed) can be used for nickel pins as they are more easily soldered.

Because of the difficulty in soldering kovar pins, it may be easier to use inorganic fluxes which are composed mainly of $ZnCl_2$, NH_4Cl , etc.

If you use these fluxes, please be reminded that flux residue must be carefully wiped off after soldering in order to avoid the corrosion of the pins.

4. Surface Preparation

The soldered surface must be free of any contamination from grease, dust, etc. as well as from corrosion and oxidation.

The soldered surface must be heated to the proper temperature. The melting point of the solder recommended above is 188°C, and the strongest adhesive strength can be attained by keeping both soldered surfaces at 250°C for soldering.

5. Application of Solder

Solder should be applied on both surfaces which are to be soldered.

To obtain the best results, a soldering iron temperature of 350°C is suggested.