

How to determine the right UV sensor for flame detection?

▶ USING A TOCON



Picture of TOCON

The basic principle of all sglux UV sensors for flame detection is the same. A focusing lens collects the UV radiation emitted by a flame (natural gas, hydrogen, or oil) and focusses the light on a silicon carbide (SiC) UV detector chip that generates a small photo current. This photo current is usually measured in nanoamps, and it requires amplification and a conversion to a voltage. A common approach is to use an sglux TOCON, photodiode/amplifier hybrid. The output of a TOCON is 0 to 5 volts and is proportional to the intensity of the flame.

The most sensitive TOCON is currently the TOCON_ABC1 (1.8 nW/cm²). This TOCON is used for weak flames or when the flame is not close to the device. If the flame is near to the sensor or if the flame's intensity is high, then a TOCON_ABC2 (18 nW/cm²) could be the better choice.

While in use, the TOCON may reach the upper limit of its measurement range, and the amplifier will saturate. This means that the output voltage will rise to within a few millivolts of the power supply voltage, and it will not change with increases in flame intensity. Depending on how strongly the amplifier saturates, this may affect the TOCON's signal fall time after the flame intensity decreases. In some cases, the delay in fall time may be several hundred milliseconds. One option would be to use a TOCON_F, which uses a logarithmic amplifier and does not saturate. The maximum operating temperature of standard TOCON detectors is 85° C. TOCONs with a maximum operating temperature of 120° C can be produced on special order. However, it is recommended that the continuous maximum operating temperature be kept below 70° C.

At early stages of UV flame detection project, it is difficult to predict which TOCON will be the best option and may require some experimentation with all three types of TOCONs. An accessory that may be useful is the TOCON_steel housing. This is a stainless steel housing with a fully threaded body, connector, and 2-meter cable, which can ease mounting and wiring of the TOCON.



TOCON_steel housing

▶ USING A PHOTODIODE



SG01F-5ISO90 photodiode

Besides the TOCONs, sglux produces two photodiodes for flame detection, the SGo1D-5LENS and SGo1F-5. Both detectors require an external amplifier like the sglux VOLTCON_flame. The SGo1D-5LENS includes a lens in the housing but the SGo1F-5 does not and may require an external concentrating lens. Also available are detectors consisting of two photodiode chips, one for measuring UV radiation and one for the infrared.