Series 47K Gas Sensor

Remote Combustible Gas Detection

MSA
The Safety Company

Because every life has a **purpose…**

Broad range of sensors and accessories

MSA remote sensors, Series 47K, are designed to detect potentially hazardous concentrations of flammable gas and vapour in air.

A cost effective range of sensors for detecting up to 100% LEL including Poison Resistant and High Temperature versions.

Series 47K sensors are available with either Ex d – 3/4" NPT or Ex e – M25 junction boxes.

A complete range of accessories for calibration, environmental protection, sampling and duct mount ing makes it suitable for virtually all applications in combustible gas detection.

Series 47K sensors used in combination with MSA Controllers fully meet the requirements of ATEX Directive 2014/34/EU, including performance, and being SIL 2 capable they can be used as part of a safety related system.

Features & Benefits

- 0–100% LEL
- Ex e junction box with M25 cable gland thread
- Ex d junction box with 3/4" NPT cable gland thread
- Poison Resistant (PRP) and High Temperature (HT) versions
- Suitable for use in safety related systems (ATEX 2014/34/EU)
- 3 or 5 wire connection
- Stainless steel body
- Complete range of accessories
- Fast response time
- Excellent performance cost ratio
- Safety Integrity Level – SIL 2

Sensor Types

MSA sensors are available as standard in a stainless steelbody.

Series 47K-PRP: high resistance to atmospheres containing silicones, lead, sulphur compounds and halogenated hydrocarbons over a temperature range −40 °C to +90 °C

Series 47K-HT: to operate over a temperature range −40 °C to +160 °C

Installation & Operation

The number and location of sensors is important to achieve the most reliable detection of flammable gas or vapour. There are several factors to be considered before installing the sensor.

(See also EN 60079-29-2 "Guide for selection, installation, use and maintenance of apparatus for the detection and measurement of combustible gases or oxygen")

- Location of potential sources of a gas leak
- Location of potential sources of ignition
- Ventilation and airflow patterns
- The gas or vapour density with respect to air
- The physical properties of the gas or vapour
- Structural arrangements which could allow gas to accumulate
- Environmental conditions

Applications

- Chemical & Petrochemical Industry
- Printing Industry
- Pipelines
- Gas Industry
- Refrigeration Industry
- LPG Storage and Transportation
- Shipboard
- Paint Manufacture
- Solvent Recovery & Storage
- Loading-Unloading of Hazardous Gas & Vapour
- Automotive Test Benches
- Boiler Rooms
- Turbine & Compressors
- Biofuels

Accessories

There are applications where the sensors cannot be installed close to the potential source of a gas or vapour leak. This may be due to extremely high temperature, higher or lower atmospheric pressure, difficult to access locations, high flow-rate of air to be monitored or the presence of dust.

For these applications, MSA offers a variety of accessories such as flowthrough adaptors or duct mount flanges, which allow reliable, trouble-free detection with minimum maintenance.

Additional accessories are available for environmen tal protection and a remote/in-situ calibration kit for ease of maintenance.

47K 3/4" NPT

Measuring Principle

The MSA 47K Series of sensors operate on the principle of cata lytic combustion. The sensing element consists of a pair of filaments ("pellistors") connected to a pair of precision resistors to form a Wheatstone bridge. One of the filaments, the detector, is coated with a catalyst, whilst the other, the compensator is used as a reference to achieve the best stability.

The gas or vapour diffuses through a porous Stainless Steel sintered disc, which acts as a flashback arrestor. When gas comes into contact with the surface of the detector filament, it is oxidised.
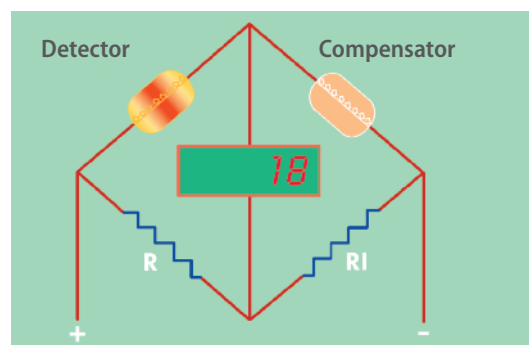
The heat generated by the reaction increases the temperature of the detector, which results in a change of the detector electrical resistance, and hence an unbalance of the Wheatstone bridge. The result is an output signal directly proportional to the concentration of the flammable gas or vapour.

47K M25 x 1.5

Approvals

The Series 47K sensors are "performance" approved according to EN 60079-29-1 when operated in conjunction with an MSA type approved Controller. They can therefore be used as safety related devices meeting the requirements of ATEX Directive 2014/34/EU.

The sensors are ATEX approved according to new standards EN 60079-0, EN 60079-1, EN 60079-31 for use with or without an Ex d or Ex e certified juncion box.

Series 47K sensors are also certified SIL 2 capable by TUV.

EC Type Certificate:

Ex EX II 2G INERIS 03ATEX 0208

Ex d IIC T6 −40 °C +40 °C

Ex d IIC T4 −40 °C +90 °C

Ex d IIC T3 −40 °C +160 °C (HT)

Ex EX II 2D INERIS 03ATEX 0208

Ex tb III B IP6X T 85 °C −40 °C +40 °C

Ex tb III B IP6X T 135 °C −40 °C +90 °C

Ex tb III B IP6X T 200 °C −40 °C +160 °C (HT)

EXAM Test Reports:

PFG-41300204P/NI 47K-PRP

PFG-41300204P/NIII 47K-HT

HT sensor and wall mount bracket

Technical Specifications

Sensor

Sensor	
Power consumption	1 watt typical
Measuring range	0–100 % LEL
Response time	$\tau_{50} \leq 10$ sec. $\tau_{90} \leq 30$ sec.
Operating life	3 years minimum in clean air @ STP
Storage life	5 years minimum in MSA container @ STP
Storage temperature	−20 °C to +40 °C
Operating temperature range	−40 °C to +55 °C (PRP) −40 °C to +90 °C (extended range*) −40 °C to +160 °C (HT)
Operating humidity range	5 % to 95 % RH non-condensing
Operating pressure range	100 ±20 kPa
Air velocity	0 – 6 m/s (with duct mount flange 0.5 – 20 m/s)
Poison resistance	PRP sensor only: 10 ppm HMDS for 40 min. (max. signal loss 5% of reading)
Weight	ca. 230 g (St.St. sensor)
Dimension	Ø 36 x 56 mm
Material	Stainless steel
Accessory thread	M36 x 1.5 mm
Sensor to junction box	3/4" NPT or M25 x 1.5 mm
Approvals	EC Type Certificate: ⟨Ex⟩ II 2GD INERIS 03 ATEX 0208
Safety Integrity Level	SIL 2 (IEC 61508)

Extended range: The sensor extended temperature range is greater than the maximum specified in EN 61779-1-4. It is therefore strongly recommended that if used above +55 °C the sensor is calibrated at the operating temperature.

Junction Box

Junction Box	Flameproof (Ex d)	Increased safety (Ex e)
Weight	870 g	813 g
Cable gland thread	3/4" NPT	M25 x 1.5 mm
Terminals	5 x 2.5 mm^2	5 x 2.5 mm^2
Material	Aluminium (powder coated)	
Dimension	120 x 97 x 170 mm (W x D x H)	
Approvals	EC Type Certificate: BVS 10 ATEX E 066X	
	Ex d IIC T6 or T4	Ex e II T6 or T4
	Ex tb III B IP6x T85 °C or T135 °C T6 −50 °C ≤ Ta ≤ +40 °C T4 −50 °C ≤ Ta ≤ +80 °C T85 °C −50 °C ≤ Ta ≤ +40 °C T135 °C −50 °C ≤ Ta ≤ +80 °C	

Ordering Information

Gas Detector (Sensor & Junction Box)

Part-No.	Description	Sensor Material	Junction Box Thread	Type
10114106	S47K-PRP, screw	St.St. 316	M25 x 1.5	Ex e
10123076	S47K-PRP, screw, calibrated	St.St. 316	M25 x 1.5	Ex e
10114109	S47K-PRP, spring	St.St. 316	M25 x 1.5	Ex e
10123095	S47K-PRP, spring, calibrated	St.St. 316	M25 x 1.5	Ex e
10114107	S47K-PRP, screw	St.St. 316	3/4" NPT	Ex d
10178834	S47K-PRP, screw, calibrated	St.St. 316	3/4" NPT	Ex d
10114110	S47K-PRP, spring	St.St. 316	3/4" NPT	Ex d
10178833	S47K-PRP, spring, calibrated	St.St. 316	3/4" NPT	Ex d

Sensor

Part-No.	Description	Material	Thread
10147542	47K-HT-PRP	St.St. 316	M25 x 1.5
10048118	47K-PRP	St.St. 316	M25 x 1.5
10147537	47K-HT-PRP	St.St. 316	M25 x 1.5
10048272	47K-PRP	St.St. 316	3/4" NPT
10048825	47K-HT	St.St. 316	3/4" NPT
10048199	47K-HT	St.St. 316	M25 x 1.5

Junction Box & Wall Mount Bracket

Part-No.	Description	Material
10114111	Ex e, 2 x M25 x 1.5	Aluminium
10114112	Ex d, 2 x 3/4" NPT	Aluminium
10048829	Wall mount bracket Ø 25 mm	St.St. 316
10151980	HT junction box 100 °C	Aluminium

Accessories

Part-No.	Description	Material
10049316	Calibration cap	PVC
10051623	Weather protection cap – hose	St.St. 316
10051731	Weather protection cap – 1/8 NPT	St.St. 316
10051625	Flow-through adapter	St.St. 316
10051626	Flow-through adapter	Aluminium
10112790	Duct mount flange	St.St. 316

Flow-through adapter   Calibration cap   Weather protection cap

Duct mount flange

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