

OPERATING INSTRUCTION

GAS SENSOR GMF 230 H



GMF 230 H for combustible gases
lighter than air heavier than air



GMF 230 H for refrigerants

Important!

The manual „Safety for Installers and Operators“ must be observed!
If not supplied with this manual, please request for information.

Sensor Technology

The sensor GMF 230 H is powered by semiconductor sensors.

The sensor must be heated so that it is able to react to gases.

The heat current depends to the sensor and is at a heat voltage of 5 V in the range of 80 up to 200 mA.

The sensor signal is converted into the motherboard on a measuring current range of 4..20mA.

This current signal is on the connection circuit board digitally scanned and passed as a measured value to the BUS.

The settings on the connection board are factory set.

BUS-Wiring

The current consumption of the sensor is to 24VDC 30 mA.
This must be taken into account when starting BUS cabling:

The number of sensors per cable harness can be determined with the empirical formula $n = 4000 / \text{cable length}$.
when using the standard cable JY (St) Y 2x2x0,8mm.

By total number of all sensos must not be exceeded the available total power of the power supply.

Sensor-Connection

The gas sensor GMF 230 can be operated with an unregulated DC voltage of 8-36V.

As sensor-lead the shielded cable JY (St) 2x2x0.8 mm can be used.

The wire colors can be assigned as follows:

Red => +24V (cl 1) white => A (Cl 2), yellow => B (Cl 3), black => 0 V (terminal 4), drain wire => screen (KI 5)

The drain wire must be connected at the evaluation unit to terminal 5 (shield).

The drain wire is connected in the cable to the shield.

The drain wire has to be connected at the sensor.

CAUTION: When installing, make sure that bare wire and bare drain wire are coated with an insulating and must not come into contact with the circuit.

Is the metal housing mounted on grounded steel beams, the drain wire and the wire for terminal 5 (shield) must not be connected at the evaluation unit.

Adjustment

The sensor which has to be adjusted must be in operation for 1 week, so that it has stabilized, after you can start with the adjustment.

**The sensors can be adjusted on two curve points:
2 alarm points or alarm + zero point**

Aids

- Voltmeter 0-20V
- Screwdriver
- Zero gas (synthetic air)
- Calibration gas
- Gas supply fittings (flow controller, flow meter 0-1 liter / min)
- Gas supply adapter

1. Adjustment Curve point 1

Enter the gas concentration of alarm point 2 (main alarm) and adjust the voltage to the measuring pins "MP1" with the trimmer "P1" on 0,00..1,00 mV.
(For example, for 40% LEL: 1,412 volts from the table of values).

3. Adjustment zero point resp. adjusting curve point 2

Please make sure, that the sensor is applied for a few minutes without gas concentration or enter by means of a gas supply adapter with diffuser zero gas (synthetic air) and adjust the trimmer "P3" so that displays on the measurement indicator the signal conditioning 0,00 or at the measuring pin MP2 of the sensor is to be measured a **voltage** of 0.4 volts.

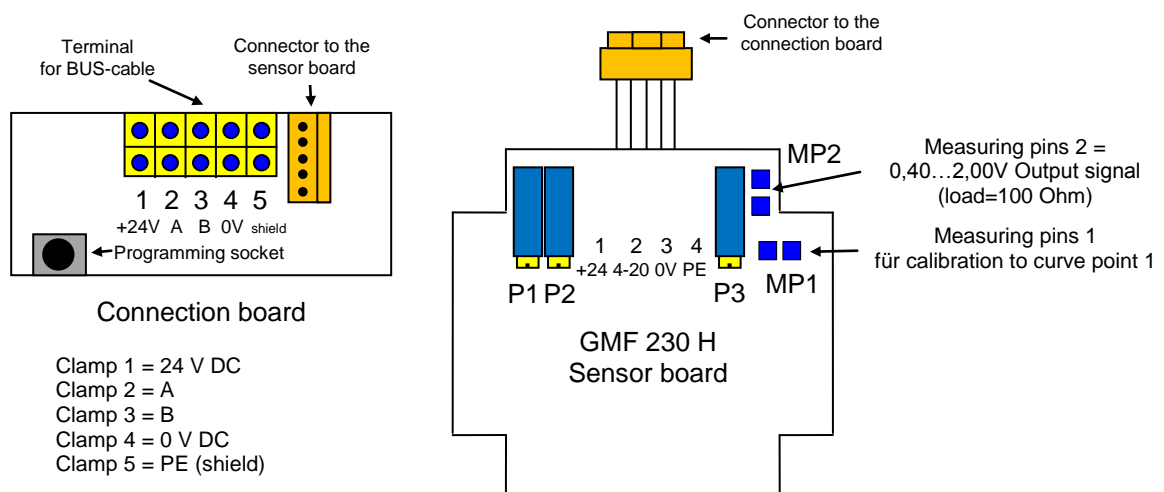
The signal curve of the sensor corresponds thereby

- exactly at setpoint 2
 - and exactly at the zero point
- the values of the evaluation table.

Alternative to the zero point, a gas concentration is to be applied to the corresponding switchpoint 1 and the sensor signal with "P3" is to be set to the table value of switching point 1

If the first curve point calibration done accurately, the associated value is not affected by the setting of the second curve point or the zero point, and these can also be adjusted if necessary.

Diagram of GMF 230 H



Evaluation Tables for semiconductor sensors with logarithmic signal:

Measuring range 0...100% LEL	
Gas Concentration [%LEL]	Measuring pin MP2 [V] Load = 100 Ohm
0	0,400
10	0,906
20	1,116
25	1,200
30	1,276
40	1,412
100	2,000

Measuring range 0...500 ppm	
Gas concentration [ppm]	Measuring pin MP2 [V] Load = 100 Ohm
0	0,400
25	0,758
50	0,906
100	1,115
125	1,200
150	1,276
175	1,346
200	1,412
250	1,531
375	1,786
500	2,000

Measuring range 0...1500 ppm	
Gas concentration [ppm]	Measuring pin MP2 [V] Load = 100 Ohm
0	0,400
100	0,813
200	0,984
300	1,116
400	1,226
500	1,324
700	1,493
800	1,568
1000	1,706
1200	1,831
1500	2,000

Measuring range 0...1000 ppm	
Gas concentration [ppm]	Measuring pin MP2 [V] Load = 100 Ohm
0	0,400
50	0,758
100	0,906
200	1,115
250	1,200
300	1,276
350	1,346
400	1,412
500	1,531
750	1,786
1000	2,000

Measuring range 0...2000 ppm	
Gas concentration [ppm]	Measuring pin MP2 [V] Load = 100 Ohm
0	0,400
100	0,758
200	0,906
400	1,115
500	1,200
600	1,276
700	1,346
800	1,412
1000	1,531
1500	1,786
2000	2,000

Commissioning

The setting of the sensor must be checked during commissioning by a test gas supply adapter

Maintenance

In order to maintain the functional reliability maintenance at specified intervals is necessary. The maintenance interval can be taken from inspection sticker on the evaluation unit. It is no longer than 1 year. The Ordinance on Industrial Safety calls for a maintenance interval of 4 months.

Decommissioning

If the sensor is longer than 4 weeks off, it must be checked with test gas and if need be recalibrated after one week of operation.

Warranty

As a manufacturer, we assume a warranty for the devices from date of purchase of 2 years.

This is valid in all countries where the devices are sold by authorized dealers.

Within this warranty period we will rectify by repair or replacement of appliances all defects that are based on material or manufacturing defects.

The warranty does not cover: damage due to improper use, normal wear and tear defects that affect the value or usability of the device only insignificantly.

In particular sensors with heated sensors (all semiconductors, pellistors, and zirconium oxide) may be formed by the evaporation of substances existing in the ambient air, solid material residues on the sensor pills, which may alter the sensitivity greatly or significantly reduce, thereby the durability may drop significantly.

Should the sensor be on-site existing foreign substances, such as coffee powder, oil vapors, refrigerant-oil mixture, halogens, floor coatings, etc. completely and / or partially destroyed and therefore must be replaced with a new sensor (moreover, it could not be called any pollutants in advance) so this does not represent a warranty case.

The oxygen sensor must be returned at allegedly technical defects to the main plant to Denkendorf for local technical examination. Only when the local investigation establishes beyond reasonable doubt, that it is a material or a manufacturing fault, this sensor – in the context of guarantee residual maturity - will be changed free of charge. All possibly further beyond that costs such as postage costs, travel costs, exchange and cost of technicians etc. will not be additional the expense of UMSITEC.

But if, for example, the investigation in our main plant in Denkendorf shows that the defect was caused by an on-site damage (accidentally or intentionally), misapplication, or incorrect operation, the incurred investigation costs will be charged to the account of the respective user / operator / maintenance company.

Interventions by unauthorized locations or when using other than original spare parts, the warranty will be voided immediately.

In order to avoid all possible problems from the outset, we advise from our practical experience of the past few years at initial transfer and / or upgrading of flooring in refrigeration units. Instead of the semiconductor sensor it would be better to upgrade to infrared sensor in advance.

Because, as already described above, with a probability bordering on certainty through such operations the conventional semiconductor sensor be destroyed very quickly on site.

A normal 1:1 exchange provides also no solution, because flooring outgassing exists for a long time and renewed semiconductor sensors be destroyed also immediately on site. This is, as already described, not covered by guarantee.

Technical Data: GMF 230 H for combustible gases

Applications: dusty, dirty areas
 Measuring principle: semiconductor
 Type of gas: combustible gases and solvents
 Measuring range: 0...100 % LEL
 Accuracy: <+-5% FS
 Response time T90: < 20 sec
 Temperature range: -20..+60°C (environment)
 Humidity range: 0..95% RH
 Pressure range: 700-1300 hPa
 Housing: aluminium, LxWxH: 80x80x60mm
 Protection class: IP65
 Gas inlet: diffusion, sinter filter, IP44
 BUS-Topology: RS 485
 Lifetime: >10 years in dry, oil-free environments
 CE-conformity: emission: residential area
 immunity: industrial area
 Weight: 430g
 Supply: 12-36V DC
 Consumption: approx. 30 mA @ 24 V DC
 Connecting cable: JY (ST) Y 2x2x0,8 mm²

Selection: GMF 230 H for combustible gases

Bestell-Nr. / order number	Gasart / gas type	Messbereich / measuring range
GMF 230 H ACT UEG	Acetone	0...100 % LEL
GMF 230 H ACN UEG	Acetylene	0...100 % LEL
GMF 230 H HC UEG	Gasoline vapours	0...100 % LEL
GMF 230 H BUT UEG	Butane	0...100 % LEL
GMF 230 H ETA UEG	Ethane	0...100 % LEL
GMF 230 H ETL UEG	Ethanol	0...100 % LEL
GMF 230 H ETB UEG	Ethyl benzene	0...100 % LEL
GMF 230 H ETN UEG	Ethylene	0...100 % LEL
GMF 230 H CH2O 2300	Formaldehyde	0...2300 ppm
GMF 230 H HEP UEG	Heptane	0...100 % LEL
GMF 230 H HEX UEG	Hexane	0...100 % LEL
GMF 230 H IPRPL UEG	Isopropanol	0...100 % LEL
GMF 230 H CH4 UEG	Methane	0...100 % LEL
GMF 230 H MTL UEG	Methanol	0...100 % LEL
GMF 230 H MEK UEG	Methyl ethyl ketone	0...100 % LEL
GMF 230 H NON UEG	Nonane	0...100 % LEL
GMF 230 H PRP UEG	Propane	0...100 % LEL
GMF 230 H STY UEG	Styrene	0...100 % LEL
GMF 230 H THF UEG	Tetrahydrofuran	0...100 % LEL
GMF 230 H TOL UEG	Toluene	0...100 % LEL
GMF 230 H H2 UEG	Hydrogen	0...100 % LEL
GMF 230 H	further on request	further on request

Technical Data: GMF 230 H for refrigerants

Applications: cooling centers,
dusty, dirty areas
Messprinzip: semiconductor
Gasart: various refrigerants
Measuring range: 0...2000 ppm
Accuracy: <+-5% FS
Response time T90: < 60 sec
Temperature range: -20..+50°C (environment)
Humidity range: 0..95% r.F.
Pressure range: 700-1300 hPa
Housing: aluminium, LxWxH: 80x80x60mm
Protection type: IP65
Gas inlet: diffusion, sinter filter, IP44
BUS-Topology: RS 485
Lifetime: >10 years in dry,
oil-free environments
CE-conformity: emission: residential area
immunity: industrial area
Weight: 430g
Supply: 12-36V DC
Consumption: approx. 30 mA @ 24 V DC
Connecting cable: JY (ST) Y 2x2x0,8 mm²

Selection: GMF 200 H for refrigerants

Order number	Gas type	Measuring range
GMF 230 H R11 2300	R11	0...2000 ppm
GMF 230 H R12 2300	R12	0...2000 ppm
GMF 230 H R22 2300	R22	0...2000 ppm
GMF 230 H R23 2300	R23	0...2000 ppm
GMF 230 H R123 2300	R123	0...2000 ppm
GMF 230 H R32 2300	R32	0...2000 ppm
GMF 230 H R134a 2300	R134a	0...2000 ppm
GMF 230 H R143 2300	R143	0...2000 ppm
GMF 230 H R152a 2300	R152a	0...2000 ppm
GMF 230 H R245 2300	R245	0...2000 ppm
GMF 230 H PRP UEG	R 290 Propane	0...100 % LEL
GMF 230 H R404A 2300	R404a	0...2000 ppm
GMF 230 H R407C 2300	R407c	0...2000 ppm
GMF 230 H R410A 2300	R410a	0...2000 ppm
GMF 230 H R417A 2300	R417C	0...2000 ppm
GMF 230 H R507a 2300	R507a	0...2000 ppm
GMF 230 H R507C 2300	R507C	0...2000 ppm
GMF 230 H BUT UEG	R 600 Butane	0...100 % LEL
GMF 230 H NH3 1500	R 717 NH3	0...1500 ppm
GMF 230 H	further on request	further on request

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Technical changes reserved