Features

- **Internal function monitoring with integrated hardware watchdog**

- **Hardware and software according to SIL2 compliant development process**

- **Easy maintenance / calibration by replacing the sensor cartridge or via comfortable on-site calibration**

- **Up to three different sensor readings can be built in from different gases**

- **LCD display (option)**

- **Status LED for alarm, fault, operation and service (option)**

- **Warning buzzer (option)**

- **Reset button (option)**

- **UPS (option)**

- **Life span: 15 years**

Application

This detector is used as a stand-alone unit with its relay outputs or alternatively with its analog output signal or ModBus.

It is also used as a two-wire connection and contact by Modbus anywhere in the building network.

The SFR is designed for detection and warning of carbon dioxide gases in many commercial and industrial applications such as freeze and refrigeration application.

Design Features

Gas measuring, monitoring and warning detector based on state-of-the-art micro-technology for continuous monitoring of the ambient air to detect Carbon Dioxide.

The detector monitors the measured values and activates the alarm relays if the set alarm thresholds for pre-alarm and main alert are exceeded.

In addition, the values are provided for direct connection to the BMS via an RS-485 Modbus interface and also as 4-20 mA output.

The SIL 2 compliant self-monitoring function in the SFR and in the connected sensor activates the fault message in case of an internal error as well as in case of a fault in the local bus communication and/or at the 4-20 mA input / output current signals.

Other options such as LCD display, three-color status LED, buzzer, digital input for acknowledgment or test function, various communication protocols ensure proper adaptation to the wide range of applications in gas detection technology.

For convenient commissioning the SFR can be pre-configured and parametrised with factory-set defaults.

Ordering Codes on next page

Technical Data	Sensor Board
Power supply	24Vac/dc reverse-polarity protected or 230Vac
Power consumption (24 Vdc)	Max. 60 mA (1.5 VA)
Sensor	Max. 85 mA (2.1 VA)
horn / warning light	Max. 40 mA (1.0 VA)
Alarm relays (3)	250 Vac, 5 A, potential-free, contacts (SPDT)
Volt free output (2)	24 Vdc/ 0.1 A (switching to plus)
Digital input (2)	Potential-free
Analog input (2)	4 – 20 mA overload and short-circuit proof, input resistance 200 Ω
Analog output signal (1)	Proportional, overload and short-circuit proof, load ≤ 500 Ω
	4-20 mA or 2-10V = meas. range **3.0 <4 mA =** underrange **>20- 21.2 mA =** overrange **2.0 mA =** fault
Output for local bus	5 Vdc, 250 mA max. Overload, short-circuit and reverse-polarity protected
Temperature range	**-25 °C to +50 °C (-13 to 122 °F) (-35 °C to +40 °C on requst)**
Humidity range	15 - 95 % r.H not-condensing
Storage temperature	+5 °C to +30 °C (+41 °F to +86 °F)
Storage time	6 months
GCD bus	1-wire / 19200 Baud
Field bus, Modbus	RS 485 / 19200 Baud
Tool bus	2-wire / 19200 Baud
Housing	Polycarbonate
Combustion	UL 94 V2
Housing colour	RAL 7032 (light grey)
Dimension housing (W x H x D)	130 x 130 x 75 mm (5.12 x 5.12 x 2.95 in.)
Weight	ca. 0.6 kg (1.32 lb.)
Protection class	IP 65
Installation	Wall mounting
Cable entry	Standard 6 x M20/25

Wire connection:

-	**Local bus (SC2)**	3-pin connector
-	**Digital input, analog output**	Screw-type terminal min. 0.25 mm², max. 1.3 mm²
-	**Power supply, relays**	Screw-type terminal min. 0.25 mm², max. 2.5 mm²

Mounting height	**0.3 - 1 m above floor**

Pre-programmed alarm output **(Standard 0-2000 ppm)**	Alarm 1 = 600 ppm Alarm 2 = 800 ppm Alarm 3 = 1000 ppm

Directives	EMC directives 2014/30/EU Low voltage directive 2014/35/EU CE Conformity to: EN 50271 / IEC 61508 60079-29-1 EN 61010-1:2010 ANSI/UL 61010-1 CAN/CSA-C22.2 No. 61010-1 1 year on material

Technical Data — Sensor

Electrical	
Power supply	5 Vdc from sensor board, reverse polarity protected
Power consumption:	50 mA, max. (1.0 VA)
Serial interface local bus	1-wire / 19200 Baud
Sensor element	Infrared, NDIR
Measuring range	0 – 2000ppm, 0 - 5000 ppm, 0 - 2 vol %, 0 - 5 vol %
Accuracy	< 10% of its range
Measuring intervals	2 secs
Response time t_{90}	≤120 sec.
Pressure range	Atmospheric ± 30 % (influence + 1.6% on measured value per kPa)
Relative gas density	1.53 (Air = 1.0)
Sensor life time	15 years / normal ambient conditions
Calibration interval[1]	5 years
Storage temperature range	+ 5 to + 30 °C (41 to 86 °F)
Warranty	1 year on material (without sensor element)

[1] Manufacturer-recommended calibration interval for normal environmental conditions.

Ordering Codes

Supply Voltage	24Vac/dc (12Vdc on request)	
SFR 2000		0 - 2000 ppm
SFR 5000		0 - 5000 ppm
SFR 002		0 - 2 vol%
SFR 005		0 - 5 vol%
Supply voltage 230 Vac		
SFR 2000/3		0 - 2000 ppm
SFR 002/3		0 - 2 vol%
SFR 005/3		0 - 5 vol%
Supply voltage	24Vac/dc (12Vdc on request) Display and keyad	
SFR 2000D		0 - 2000 ppm
SFR 5000D		0 - 5000 ppm
SFR 002D		0 - 2 vol%
SFR 005D		0 - 5 vol%
Supply voltage	230Vac, Display and keypad	
SFR 2000D/3		0 - 2000 ppm
SFR 5000D/3		0 - 5000 ppm
SFR 002D/3		0 - 2 vol%
SFR 005D/3		0 - 5 vol%
XFR 2000	Sensor Head	0 - 2000 ppm for exchange (15 years)
XFR 5000	Sensor Head	0 - 5000 ppm for exchange (15 years)
XFR 002	Sensor Head (Repl.)	0 - 2 vol% for exchange (15 years)
XFR 005	Sensor Head (Repl.)	0 - 5 vol% for exchange (15 years)
SPS 12	Power Supply 12Vdc	
USV 90240	Battery Power Supply 90 - 240V/24V 0.8Ah	
SPS 230	Power Supply 90 - 240Vac/15VA	
SSTOP	Reset button with external input, incorporated in detector	
SBUZ LED	Buzzer with built-in LED indication in three colours, incorporated in detector	
SDUCT	Duct Kit	
DR 24/30	Power supply 24Vdc	
SSTAIN	Option, stainless housing	
SP 600	Impact protection	

LCD display	Options
LCD	Two lines, 16 characters each, background highlighted in two colours
Operation	Menu driven via six push-buttons
Power consumption	5V, 60 mA, 0.3 VA
Status LED	
Colour / mode	Red / yellow / green (alarm–fault – operation - service)
Protection class	IP 65
Warning buzzer	
Acoustic pressure	> 90 dB (A)
Frequency	2300 Hz
Protection class	IP 65
Power supply 230Vac	
Wide range input	90 -240Vac - 50/60 Hz
Output rating type 5	5 VA
Output rating type 7	15 VA
UPS	
Power unit with wide range input	90 -240Vac - 50/60 Hz
Output rating	15 VA
Rechargeable battery	12V, 0.8 Ah
Operating time	> 60 min
Power supply 12Vdc	12Vdc reverse-polarity protected
"Power consumption (12 Vdc) - sensor - horn / warning light"	"Max. 120 mA (1.5 VA) Max. 170 mA (2.1 VA) Max. 80 mA (1.0 VA)"

Ordering Codes

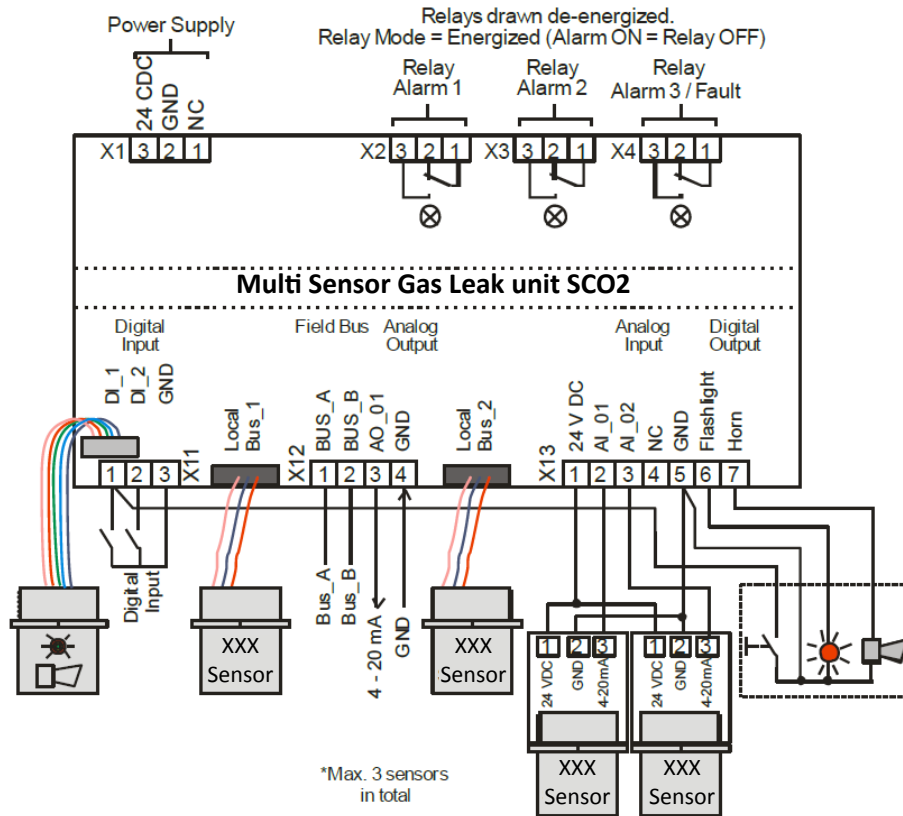| **Alarm Units**	
AAW 24	Warning Horn 24Vdc 98dB
AAW 230	Warning Horn 230Vac 98dB
OA 24	Flashlight 24Vdc, red
OAW 24	Combined Warning Horn/Flashlight, 24Vdc 98dB
OAW 230	Combined Warning Horn/Flashlight, 230Vac 98dB
OAW 24T	Combined Warning Horn/Flashlight with reset button, 24Vdc 98dB
Warning Plate	
Gas Alarm	Flashing gas alarm plate "GASALARM" 24Vac/dc

SHORT DESCRIPTION OF THE FUNCTION: DIGITAL OUTPUTS WITH THREE RELAYS

Action	Reaction Relay 1 (Alarm1)	Reaction Relay 2 (Alarm2)	Reaction Warning light (Alarm 2)	Reaction Horn (Alarm 2)	"Reaction Relay 3 (Alarm2 + fault)"	Reaction LED
Gas signal < alarm threshold 1	OFF	OFF	OFF	OFF	ON	GREEN
Gas signal > alarm threshold 1	ON	OFF	OFF	OFF	OFF	RED
Gas signal > alarm threshold 2	ON	ON	ON	ON	ON	RED
Gas signal < alarm threshold 2, but button Horn OFF activated	OFF		ON	OFF after delay ON		RED
Gas signal < (alarm threshold 2 - hysteresis) but >= alarm threshold 1	ON	OFF	OFF	OFF	OFF	RED
No alarm, no fault	OFF	OFF	OFF	OFF	ON	GREEN
No fault, but maintenance due	OFF	OFF	OFF	OFF	ON	GREEN flashing
Internal error	OFF	OFF	ON	OFF	OFF	YELLOW

Note 1: Status OFF = Relay is configured "Alarm ON = Relay" or the SCO is free from voltage.
Note 2: Alarm thresholds can have the same value, therefore the relays and/or the horn and flashlight can be triggered together.

db_s_fr_ap_uk

Electrical Connection

The SFR device combines gas measurement, warning and controller for continuous monitoring of ambient air to detect toxic and combustible gases, refrigerants or oxygen.

The SFR can also be equipped with two digital sensor heads, offers an additional input for an analog sensor and is equipped with three alarm relays (230Vac/5A) and a warning module (power LED and buzzer).

The optional gas selector allows fast configuration or adjustment of the two connected sensor heads (without additional tools) - incorrectly connected or interchanged sensor heads are immediately recognized as errors.

This feature also enables the cost-effective stocking of the devices, since the configuration for a certain number of sensor types and measuring ranges can be carried out just before delivery.

Other features:

- **Internal functional monitoring**

- **SIL2 compliance according to IEC 61508**

- **Compliance to EN 378-1 and many others**

- **Reverse polarity protected, overload and short circuit proof**

- **Two transistor outputs**

- **Serial RS 485 interface for optional Modbus protocol**