



PolyGard®2

AT6 Series with Semiconductor Sensor Element for Refrigerant Gases Analog 4-20 Output

FOR **REFRIGERANT GASES IN PPM RANGE**

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FOR **REFRIGERANT GASES IN LEL RANGE (LFL)**

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Technical Datasheet



PolyGard®2

AT6 Series

**with Semiconductor Sensor Element
for Refrigerant Gases In PPM Range
Analog 4-20 Output**

FOR REFRIGERANT GASES IN PPM RANGE

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FOR REFRIGERANT GASES IN PPM RANGE

DESCRIPTION

Semiconductor sensor including digital value processing and integrated self-diagnosis, for the continuous monitoring of the ambient air to detect refrigerants.

The intelligent AT6-Refrigerants for detection of refrigerants includes a semiconductor sensor element and electronics with a measuring amplifier and a μ Controller as well as a module with a terminal for the analog output and the external power supply. The μ Processor converts the sensor's measuring signal into a linear 4-20 mA signal (or 2-10 V). All relevant data and measured values of the sensor are stored fail-safe in the internal memory of the μ Processor.

The maintenance of the device can be done either by simply exchanging the sensor or by using the integrated, comfortable calibration routine directly at the system.

APPLICATION

The PolyGard[®]2 AT6-Refrigerants is used to detect a leakage of refrigerants in a variety of applications when an analog 4-20 mA (or 2-10 V) signal is required.

FEATURES

- Internal function control with integrated watchdog
- Easy maintenance and calibration by exchange of the sensor or by comfortable on-site calibration
- Low zero-point drift
- Sensor with long life expectancy
- Hardware and software according to SIL compliant development process
- 4-20 mA (or 2-10 V) analog output with selectable signal output for Special Mode (fault, maintenance, service etc.)
- Reverse polarity protected, overload and short-circuit proof
- NEMA 4X (IP65) protection (when installed)

FOR REFRIGERANT GASES IN PPM RANGE

SPECIFICATIONS

ELECTRICAL	
Power supply	18-29 V DC, reverse-polarity protection; 18-27 V AC (only for output signal 2–10 V)
Power consumption	75 mA, max. (1.8 VA for 24 V)
Analog output signal	Proportional, overload and short-circuit proof, load ≤ 500 Ω for current signal, ≥ 50 kΩ for voltage signal 4-20 mA or 2-10 V = measuring range 3-4 mA or 1.5-2 V = underrange > 20-21.2 mA or 10-10.6 V = overrange 2 mA or 1 V = fault > 21.8 mA or 10.9 V = fault High
SENSOR ELEMENT	
Gas type	See Ordering Information
Measuring principle	Semiconductor
Measuring range	0-2000 ppm
Repeatability	± 20 % signal
t ₉₀ time	t ₉₀ ≤ 150 s (R134a)
Temperature range	-22°F to 140°F (-30°C to +60°C)
Humidity range	15-90 % RH non-condensing
Pressure range	13-16 PSI (90-100 kPa)
Storage temperature range ¹	32°F to 140°F (0°C to +50°C)
Storage time ²	12 months
Life time ³ in air	> 5 years
Calibration interval ⁴	12 months
Poisoning	Semiconductor sensors can be poisoned by silicone-containing substances or other catalyst poisons, up to complete loss of sensitivity. Their sensitivity is irreversibly impaired by halogen-containing compounds.
ENCLOSURE TYPE A	
Material / flammability classification	Polycarbonate / UL 94 V2
Housing colour	RAL 7032 (light grey)
Dimensions (B x H x D)	3.7 x 5.1 x 2.2 in. (94 x 130 x 57 mm)
Weight	0.4 lb (0.2 kg)
Package volume	1.19 gal (4.5 L)
Protection class	NEMA 4X (IP65)
Mounting	Wall mounting
Pre-embossing for cable entry / sensor	6 x M20/M25

FOR REFRIGERANT GASES IN PPM RANGE

PHYSICAL	
Housing type P	Polycarbonate UL 94 V2
Housing colour	RAL 7032 (light grey)
Dimensions (Ø x H)	0.94 x 0.87 in. (24 x 22 mm)
Weight	0.07 lb (30 g)
Protection class	NEMA 4X (IP65)
Mounting	Screw mounting, external thread 0.98 in. (M25) x 0.06 in. (1.5 mm)
Wire connection	Screw-type terminal: 0.01-0.05 in ² (0.25-1.3 mm ²), 3-pin
REGULATIONS	
Directives	EMC directives 2014/30/EU CE UKCA Compliance with: EN 378 EN 14624 EN 45544-1, -3 EN 50271 EN 61010-1:2010 ANSI/UL 61010-1 CAN/CSA-C22.2 No. 61010-1
Warranty	1 year on sensors (not if poisoned or overloaded)

¹ A deviating storage temperature can have a negative effect on sensitivity and service life.

² If stocked for a longer period, we recommend checking the zero point and recalibrating if necessary.

³ Expected service life for normal ambient conditions.

⁴ Manufacturer-recommended calibration intervals for normal environmental conditions

Semiconductor sensors that have been exposed to an increased gas concentration (> ½ full scale value) during normal measuring operation must be replaced without fail.

All specifications were collected under optimal test conditions.

We confirm compliance with the minimum requirements of the applicable standard.

FOR REFRIGERANT GASES IN PPM RANGE

OVERVIEW REFRIGERANT GASES

Group ID	Code	Gas Type	Calibration Gas	Classification	Relative Gas Density ¹ Air = 1
FR02	2061-01	R23	R23	HFC	2.44
	2061-02	R508b	R23	HFC	3.69
FR03	2063-01	R1234yf	R1234yf	HFO	4.00
	2063-02	R452a	R1234yf	HFO	2.11
	2063-03	R513a	R1234yf	HFO/HFC	3.80
	2063-04	R454c	R1234yf	HFO	3.51
	2063-05	R455a	R1234yf	HFO	3.46
	2063-06	R454b	R1234yf	HFO	2.50
	2063-07	R1234ze	R1234yf	HFO	4.00
	2063-08	R1233zd	R1234yf	HFO	n.d.
FR04	2064-01	R123	R123	HCFC	5.28
FR06	2070-01	R22	R22	HCFC	3.03
	2070-02	R401a	R22	HCFC	3.50
	2070-03	R401b	R22	HCFC	3.42
	2070-04	R402a	R22	HCFC	1.91
	2070-05	R402b	R22	HCFC	2.31
	2070-06	R403a	R22	HCFC	3.65
	2070-07	R408a	R22	HCFC	2.87
	2070-08	R409a	R22	HCFC	3.52
	2070-09	R411a	R22	HFC	2.92
FR07	2077-01	R134a	R134a	HFC	3.59
	2077-02	R407a	R134a	HFC	2.28
	2077-03	R416a	R134a	HFC	4.01
	2077-04	R417a	R134a	HFC	2.43
	2077-05	R422a	R134a	HFC	1.51
	2077-06	R422d	R134a	HFC	1.99
	2077-07	R427a	R134a	HFC	2.67
	2077-08	R437a	R134a	HFC	3.10
	2077-09	R438a	R134a	HFC	2.34
	2077-10	R449a	R134a	HFC	2.68
	2077-11	R407f	R134a	HFC	2.61
	2077-12	R450a	R134a	HFO	3.83
FR08	2080-01	R125	R407c	HFC	1.21
	2080-02	R32	R407c	FC	1.82
	2080-03	R404a	R407c	FC	3.45
	2080-04	R407c	R407c	HFC	2.59
	2080-05	R410a	R407c	HFC	1.52
	2080-06	R434a	R407c	HFC	1.65
	2080-07	R507a	R407c	HFC	2.10
	2080-08	R448a	R407c	HFC	2.62
	2080-09	R452b	R407c	HFO	2.34
	2080-10	R143a	R407c	FC	2.96

¹ The recommended mounting height depends on the relative gas density of the type of gas to be monitored. Depending on the relative gas density (d), the following recommendation therefore applies:

- d ≤ 0.85: Mounting 1-1.6 ft (0.3-0.5 m) below the ceiling
- 0.85 < d < 1.15: Mounting at 4-6 ft (1.2-1.8 m) height
- d ≥ 1.15: Mounting 1-1.6 ft (0.3-0.5 m) above the floor

FOR REFRIGERANT GASES IN PPM RANGE

ORDERING INFORMATION

AT6-	S20XX-XX-X	Gas type	Measuring range
	S2061-01-A	R23	0-2000 ppm
	S2061-02-A	R508b	0-2000 ppm
	S2063-01-A	R1234yf	0-2000 ppm
	S2063-02-A	R452a	0-2000 ppm
	S2063-03-A	R513a	0-2000 ppm
	S2063-04-A	R454c	0-2000 ppm
	S2063-05-A	R455a	0-2000 ppm
	S2063-06-A	R454b	0-2000 ppm
	S2063-07-A	R1234ze	0-2000 ppm
	S2063-08-A	R1233zd	0-2000 ppm
	S2064-01-A	R123	0-2000 ppm
	S2070-01-A	R22	0-2000 ppm
	S2070-02-A	R401a	0-2000 ppm
	S2070-03-A	R401b	0-2000 ppm
	S2070-04-A	R402a	0-2000 ppm
	S2070-05-A	R402b	0-2000 ppm
	S2070-06-A	R403a	0-2000 ppm
	S2070-07-A	R408a	0-2000 ppm
	S2070-08-A	R409a	0-2000 ppm
	S2070-09-A	R411a	0-2000 ppm
	S2077-01-A	R134a	0-2000 ppm
	S2077-02-A	R407a	0-2000 ppm
	S2077-03-A	R416a	0-2000 ppm
	S2077-04-A	R417a	0-2000 ppm
	S2077-05-A	R422a	0-2000 ppm
	S2077-06-A	R422d	0-2000 ppm
	S2077-07-A	R427a	0-2000 ppm
	S2077-08-A	R437a	0-2000 ppm
	S2077-09-A	R438a	0-2000 ppm
	S2077-10-A	R449a	0-2000 ppm
	S2077-11-A	R407f	0-2000 ppm
	S2077-12-A	R450a	0-2000 ppm
	S2080-01-A	R125	0-2000 ppm
	S2080-02-A	R32	0-2000 ppm
	S2080-03-A	R404a	0-2000 ppm
	S2080-04-A	R407c	0-2000 ppm
	S2080-05-A	R410a	0-2000 ppm
	S2080-06-A	R434a	0-2000 ppm
	S2080-07-A	R507a	0-2000 ppm
	S2080-08-A	R448a	0-2000 ppm
	S2080-09-A	R452b	0-2000 ppm
	S2080-10-A	R143a	0-2000 ppm

FOR REFRIGERANT GASES IN PPM RANGE

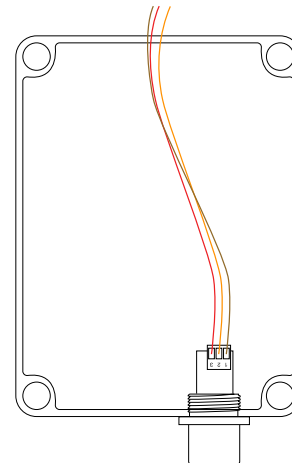
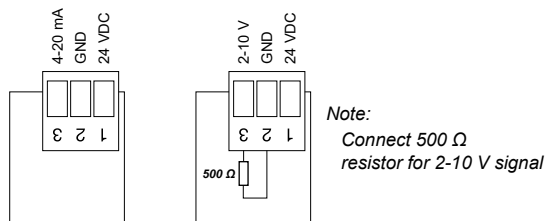
EXAMPLE

R32 sensor, measuring range 2000 ppm, with plastic housing type A
(order number: AT6-S2080-02-A)

ACCESSORY

Duct mounting kit (order number: PG2-DUCTKIT)

WIRING CONFIGURATION



Technical Datasheet



PolyGard®2

AT6 Series
with Semiconductor Sensor Element
for Refrigerant Gases In LEL Range (LFL)
Analog 4-20 Output

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FOR REFRIGERANT GASES IN LEL RANGE (LFL)

DESCRIPTION

Semiconductor sensor including digital value processing and self-control for the continuous monitoring of the ambient air to detect low-flammable refrigerants in the combustible range.

The intelligent AT6-Refrigerants for detection of low-flammable refrigerants includes a semiconductor sensor element and electronics with a measuring amplifier and a μ Controller as well as a module with a terminal for the analog output and the external power supply. The μ Processor converts the sensor's measuring signal into a linear 4-20 mA signal (or 2-10 V). All relevant data and measured values of the sensor are stored fail-safe in the internal memory of the μ Processor.

The measured value display of the sensors is in % LEL (in this case, the unit "% LFL", which is customary in this trade, is synonymous with LEL).

The maintenance of the device can be done either by simply exchanging the sensor or by using the comfortable, integrated calibration routine directly at the system.

APPLICATION

The PolyGard®2 AT6-Refrigerants is used for the detection of low-flammable gases of the refrigerant class A2L when an analog 4-20 mA (or 2-10 V) signal is required.

FEATURES

- Internal function control with integrated watchdog
- Easy maintenance and calibration by exchange of the sensor or by comfortable on-site calibration
- Low zero-point drift
- Sensor with long life expectancy
- Hardware and software according to SIL compliant development process
- 4-20 mA (or 2-10 V) analog output with selectable signal output for Special Mode (fault, maintenance, service etc.)
- Reverse polarity protected, overload and short-circuit proof
- NEMA 4X (IP65) protection (when installed)

FOR REFRIGERANT GASES IN LEL RANGE (LFL)

SPECIFICATIONS

ELECTRICAL	
Power supply	18-29 V DC, reverse-polarity protection; 18-27 V AC (only for output signal 2-10 V)
Power consumption	75 mA, max. (1.8 VA for 24 V)
Analog output signal	Proportional, overload and short-circuit proof, load $\leq 500 \Omega$ for current signal, $\geq 50 \text{ k}\Omega$ for voltage signal 4-20 mA or 2-10 V = measuring range 3-4 mA or 1.5-2 V = underrange > 20-21.2 mA or 10-10.6 V = overrange 2 mA or 1 V = fault > 21.8 mA or 10.9 V = fault High
SENSOR ELEMENT	
Gas type	See Ordering Information
Measuring principle	Semiconductor
Measuring range	0-50 % LEL
Repeatability	$\pm 20 \%$ signal
t_{90} time	$t_{90} \leq 150 \text{ s}$
Temperature range	-22°F to 140°F (-30°C to +60°C)
Humidity range	15-90 % RH non-condensing
Pressure range	13-16 PSI (90-100 kPa)
Storage temperature range ¹	32°F to 122°F (0°C to +50°C)
Storage time ²	12 months
Life time ³ in air	> 5 years
Calibration interval ⁴	12 months
Poisoning	Semiconductor sensors can be poisoned by silicone-containing substances or other catalyst poisons, up to complete loss of sensitivity. Their sensitivity is irreversibly impaired by halogen-containing compounds.
PHYSICAL	
Housing type P	Polycarbonate UL 94 V2
Housing colour	RAL 7032 (light grey)
Dimensions (Ø x H)	0.94 x 0.87 in. (24 x 22 mm)
Weight	0.07 lb (30 g)
Protection class	NEMA 4X (IP65)
Mounting	Screw mounting, external thread 0.98 in. (M25) x 0.06 in. (1.5 mm)
Wire connection	Screw-type terminal: 0.01-0.05 in ² (0.25-1.3 mm ²), 3-pin
ENCLOSURE TYPE A	
Material / flammability classification	Polycarbonate / UL 94 V2
Housing colour	RAL 7032 (light grey)
Dimensions (B x H x D)	3.7 x 5.1 x 2.2 in. (94 x 130 x 57 mm)
Weight	0.4 lb (0.2 kg)
Package volume	1.19 gal (4.5 L)
Protection class	NEMA 4X (IP65)
Mounting	Wall mounting
Pre-embossing for cable entry / sensor unit	6 x M20/M25

FOR REFRIGERANT GASES IN LEL RANGE (LFL)

REGULATIONS	
Directives	EMC directives 2014/30/EU, CE UKCA Compliance with: EN 378 EN 14624 EN 45544-1, -3 EN 50271 EN 61010-1:2010 ANSI/UL 61010-1 CAN/CSA-C22.2 No. 61010-1
Warranty	1 year on sensors (not if poisoned or overloaded)

- ¹ A deviating storage temperature can have a negative effect on sensitivity and service life.
- ² If stocked for a longer period, we recommend checking the zero point and recalibrating if necessary.
- ³ Expected service life for normal ambient conditions.
- ⁴ Manufacturer-recommended calibration intervals for normal environmental conditions

Semiconductor sensors that have been exposed to an increased gas concentration (> ½ full scale value) during normal measuring operation must be replaced without fail.

All specifications were collected under optimal test conditions.
We confirm compliance with the minimum requirements of the applicable standard.

OVERVIEW REFRIGERANT GASES

Group ID	Code	Gas Type	Calibration Gas	Classification	Relative gas density ¹ Air =1
%LFL	2020-01	R32	R32	HFC	1.82
	2020-02	R455a	R455a	CFC/HFO	3.46
	2020-03	R454b	R454b	HFO	2.50
	2020-04	R1234yf	R1234yf	HFO	4.00
	2020-05	R1234ze	R1234ze	HFO	4.00

- ¹ The recommended mounting height depends on the relative gas density of the type of gas to be monitored. Depending on the relative gas density (d), the following recommendation therefore applies:
- d ≤ 0.85: Mounting 1-1.6 ft (0.3-0.5 m) below the ceiling
 - 0.85 < d < 1.15: Mounting at 4-6 ft (1.2-1.8 m) height
 - d ≥ 1.15: Mounting 1-1.6 ft (0.3-0.5 m) above the floor

FOR REFRIGERANT GASES IN LEL RANGE (LFL)

ORDERING INFORMATION

AT6-	S20XX-XX-X	Gas type	Measuring range
	S2020-01-A	R32	0-50 % LEL
	S2020-02-A	R455a	0-50 % LEL
	S2020-03-A	R454b	0-50 % LEL
	S2020-04-A	R1234yf	0-50 % LEL
	S2020-05-A	R1234ze	0-50 % LEL

EXAMPLE

R32 sensor, measuring range 0-50 % LEL, with plastic housing type A (order number: AT6-S2020-01-A)

ACCESSORY

Duct mounting kit (order number: PG2-DUCTKIT)

WIRING CONFIGURATION

