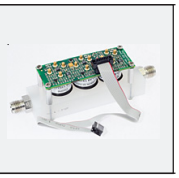
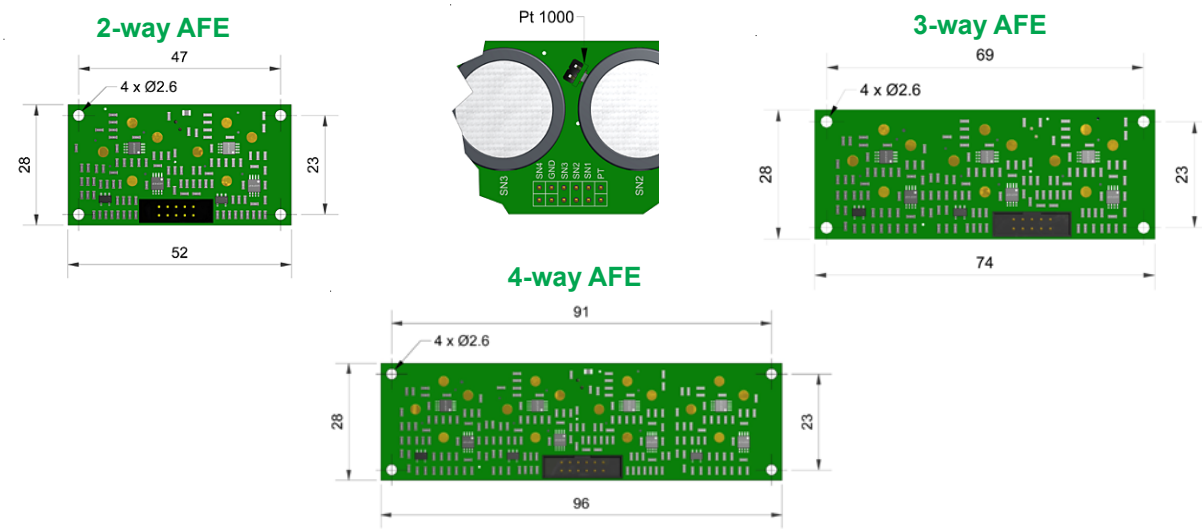
Analogue Front End (AFE)
Alphasense A4 Air Quality Gas Sensors



Technical Specification

Fig 1 AFE dimensions



All dimensions in millimetres (± 0.15mm)

Alphasense air quality sensors require low noise electronics to optimise their performance. We have worked for many years perfecting our circuits, so you can now take advantage of our low noise circuits for easiest use.

The family of Analogue Front End (AFE) circuits are designed for use with the A4 air quality sensors. Connect the AFE with A4 sensors to your multtiplexed ADC and you are recording air quality data immediately.

Features of the AFEs include:

- 2 sensor, 3 sensor, 3 sensor+PID and 4 sensor versions are available. The AFEs are analogue potentiostat circuits with on-board power regulation and reference voltages: there is no digital circuitry on the AFEs.
- Power requirement: 650uA per channel; for example, 3 sensor AFE with sensors requires only 2 mA.
- Although electrochemical sensors require + and – power supplies, the negative supply is generated on the AFE so you need only supply 3.4 to 6.4 V (low noise) and analogue ground.
- Each AFE includes a Pt1000 located next to the centre sensor for correct temperature compensation. Pt1000 output is 1mV/ºC but the room temperature must be set through your software.

AFEs are not user adjustable:

- Offset voltage for each sensor is defined in the calibration document (two offsets for each sensor: working electrode offset and auxiliary electrode offset) which you program into your software.
- AFE gain is preset. The calibration document also states the mV/ppb calibration for each working electrode which you program into your software.

Accessories include cables (specify 50 mm or 200 mm length), gassing hoods for calibration checks and mounting pillars, sealing gaskets and hardware for easy fitting to your hardware.

2 sensor AFE part numbers

Part number	SN1	SN2
810-0021-00	NO_2	O_3
810-0021-01	NO_2 or O_3	NO
810-0021-02	NO_2 or O_3	CO or SO_2 or H_2S
810-0021-03	NO	CO or SO_2 or H_2S
810-0021-04	CO	SO_2 or H_2S

3 sensor + PID AFE part numbers

Part number	SN1	SN2	SN3	PID
810-0020-00	NO_2	O_3	CO or SO_2 or H_2S	PID-AH
810-0020-01	NO_2	O_3	NO	PID-AH
810-0020-02	NO_2	CO	SO_2 or H_2S	PID-AH
810-0020-03	NO_2	CO or SO_2 or H_2S	NO	PID-AH
810-0020-04	CO	SO_2	H_2S	PID-AH

3 sensor AFE part numbers

Part number	SN1	SN2	SN3
810-0019-00	NO_2	O_3	CO or SO_2 or H_2S
810-0019-01	NO_2	O_3	NO
810-0019-02	NO_2	CO	SO_2 or H_2S
810-0019-03	NO_2	CO or SO_2 or H_2S	NO
810-0019-04	CO	SO_2	H_2S

4 sensor AFE part numbers

Part number	SN1	SN2	SN3	SN4
810-0023-00	NO_2	O_3	CO or SO_2 or H_2S	CO or SO_2 or H_2S
810-0023-01	NO_2	O_3	NO	CO or SO_2 or H_2S
810-0023-02	NO_2	CO	SO_2 or H_2S	SO_2 or H_2S
810-0023-03	NO_2	CO or SO_2 or H_2S	NO	CO or SO_2 or H_2S
810-0023-04	CO	SO_2	NO	H_2S

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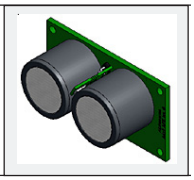
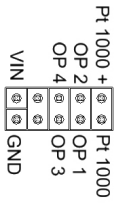
Alphasense A4 Air Quality Gas Sensors

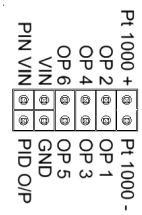


Technical Specification

Fig 2 AFE pin-out

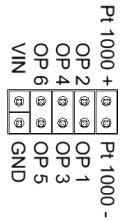


Pin-outs 2xA4 AFE with Pt 1000		
VIN	Power	
GND	Power	
OP 1	Sensor 1 (SN 1)	Working electrode
OP 2	Sensor 1 (SN 1)	Auxillary electrode
OP 3	Sensor 2 (SN 2)	Working electrode
OP 4	Sensor 2 (SN 2)	Auxillary electrode
Pt 1000	Pt 1000 +	See Notes
Pt 1000	Pt 1000 -	See Notes

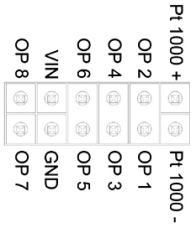


Pin-outs 3xA4 + PID with Pt 1000		
PID VIN	PID	
PID O/ P	PID	
VIN	Power	
GND	Power	
OP 1	Sensor 1 (SN 1)	Working electrode
OP 2	Sensor 1 (SN 1)	Auxillary electrode
OP 3	Sensor 2 (SN 2)	Working electrode
OP 4	Sensor 2 (SN 2)	Auxillary electrode
OP 5	Sensor 3 (SN 3)	Working electrode
OP 6	Sensor 3 (SN 3)	Auxillary electrode
Pt 1000	Pt 1000 +	See Notes
Pt 1000	Pt 1000 -	See Notes

NOTES:
Pt 1000 (+) Is connected to 2.5V on-board reference voltage via 7.41 Kohm resistor.
Pt 1000 (-) Is floating. Please connect to ground to measure the voltage at the (+) connector.
To measure Pt 1000 resistance with your circuit, remove resistor labeled RL/RT



Pin-outs 3xA4 AFE with Pt 1000		
VIN	Power	
GND	Power	
OP 1	Sensor 1 (SN 1)	Working electrode
OP 2	Sensor 1 (SN 1)	Auxillary electrode
OP 3	Sensor 2 (SN 2)	Working electrode
OP 4	Sensor 2 (SN 2)	Auxillary electrode
OP 5	Sensor 3 (SN 3)	Working electrode
OP 6	Sensor 3 (SN 3)	Auxillary electrode
Pt 1000	Pt 1000 +	See Notes
Pt 1000	Pt 1000 -	See Notes



Pin-outs 4xA4 with Pt 1000		
VIN	Power	
GND	Power	
OP 1	Sensor 1 (SN 1)	Working electrode
OP 2	Sensor 1 (SN 1)	Auxiliary electrode
OP 3	Sensor 2 (SN 2)	Working electrode
OP 4	Sensor 2 (SN 2)	Auxiliary electrode
OP 5	Sensor 3 (SN 3)	Working electrode
OP 6	Sensor 3 (SN 3)	Auxiliary electrode
OP 7	Sensor 4 (SN 4)	Working electrode
OP 8	Sensor 4 (SN 4)	Auxiliary electrode
Pt 1000	Pt 1000 +	See Notes
Pt 1000	Pt 1000 -	See Notes

Optional AFE Accessories

Cables	Description	Notes
000-CBLE-00	10 Way IDC Cable (50mm) for 2/3 sensor AFE	Connectors are from Toby AO5 series connectors
000-CBLE-01	10 Way IDC Cable (200mm) for 2/3 sensor AFE	
000-CBLE-02	12 Way IDC Cable (50mm) for 3+PID/4 sensor AFE	
000-CBLE-03	12 Way IDC Cable (200mm) for 3+PID/4 sensor AFE	
Gas Hoods	**Description**	**Notes**
000-GSHD-04	Gas Hood for 2 sensor AFE	Includes fitting kit supplied with two Swagelok SS-400-1-2RT connectors
000-GSHD-05	Gas Hood for 3 sensor AFE	
000-GSHD-06	Gas Hood for 3+PID and 4 sensor AFE	
000-TUBE-FEP	FEP Tubing (1.5m)	
Fixing kit	**Description**	**Notes**
000-0AFE-KIT	Fitting kit for AFE circuit boards	Includes 4-off Viton sealing rings

For further information on the performance of sensors in the Alphasense range or any other subject, please contact Alphasense Ltd. For Application Notes visit "www.alphasense.com"

NOTE: as applications of use are beyond our control, the information provided is given without legal responsibility. Customers should test under their own conditions, to ensure that the sensors and electronics are suitable for their own requirements.