

Prime Series

Selection & Ordering Guide

Infrared gas sensors for methane, hydrocarbons and carbon dioxide

One sensor family, one interface, one design approach — choose the detector that matches your gas and range.



3.0–5.0V

Supply voltage



3/5-pin

Package options



280mW / 45mW

Typical / low-power version



< 30s

Response time (T90)

01 Product Overview

MODEL / TARGET GAS	STANDARD RANGES / RESOLUTION	APPLICATIONS
PrimePell Hydrocarbons, methane	0–100% LEL CH ₄ / 0–100% LEL hydrocarbons / 0–100% vol CH ₄ RESOLUTION (TYPICAL) < 0.5 % of range at zero	Portable Gas Detectors: Handheld and personal safety monitors Wireless Sensor Networks: Battery-powered fixed detectors Industrial Safety: Refineries, chemical plants, and mining operations Oil & Gas: Upstream and downstream leak detection
PrimePellRP Hydrocarbons, methane (reduced power)		
Prime2 Carbon dioxide	0–5000 ppm CO ₂ / 0–5% vol CO ₂ (up to 0–10% vol) RESOLUTION (TYPICAL) < 0.5 % of range at zero	Indoor Air Quality (IAQ): HVAC systems, building automation, and ventilation control. Industrial Safety: CO ₂ monitoring in breweries, wineries, and food processing. Environmental Monitoring: Greenhouses, incubation rooms, and research.
Prime2RP Carbon dioxide (reduced power)		
Prime3 Carbon dioxide (highrange)	0–100% vol CO ₂ / (from 0–10% vol upwards) RESOLUTION (TYPICAL) 0.01% vol (0–6% vol) / 0.1% vol (6–100% vol)	Industrial Process Control: CO ₂ monitoring in fermentation, brewing, and chemical processing Food & Beverage: Modified atmosphere packaging (MAP) and storage Environmental Monitoring: Greenhouses, incubators, and controlled environments Medical & Research: Respiratory monitoring and laboratory analysis
Prime3RP Highrange carbon dioxide (reduced power)		

Shared electrical & mechanical interface.

3.0–5.0 V supply; pellistor-mimic bridge and/or linear voltage output; serial configuration access; 3-pin or 5-pin package. Supplied calibrated and temperature compensated.



Not Ex approved.

House sensors in a suitable Ex enclosure when used in hazardous areas.

02 How to Select a Sensor

YOUR REQUIREMENT	RECOMMENDED MODEL	WHY THIS MODEL
Replacing a catalytic pellistor in existing circuitry	PrimePell →	Drop-in replacement for catalytic pellistors. 80 mA typical operating current. Will not detect acetylene or hydrogen. Pellistor-mimic or Linear voltage and serial communications outputs
Hydrocarbon measurement where low power consumption is critical (e.g. battery-powered or loop-powered instruments)	PrimePellRP →	Reduced-power version of the PrimePell – 15 mA average typical, 45 mW typical at 3.0 V supply. 3 or 5 pins optional. Both Linear voltage and serial communications outputs
Carbon dioxide in the ppm and low% vol range	Prime2 →	Standard ranges 0–5000 ppm CO ₂ and 0–5% vol CO ₂ , with other ranges up to 0–10 % vol available. 80 mA typical operating current. Pellistor-mimic or Linear voltage and serial communications outputs
Carbon dioxide in the ppm and low% vol range where low power consumption is critical	Prime2RP →	Prime2RP with 15 mA average typical current and 45 mW typical power at 3.0 V supply. 3 or 5 pins optional. Both Linear voltage and serial communications outputs
Carbon dioxide up to 100% vol, with high resolution	Prime3 →	0.01% vol resolution over 0–6% vol and 0.1% vol from 6–100% vol. 80 mA typical operating current. Pellistor-mimic or Linear voltage and serial communications outputs
Carbon dioxide up to 100% vol, with high resolution where low power	Prime3RP →	Prime3RP with 15 mA average typical current and 45 mW typical power at 3.0 V supply. 3 or 5 pins optional. Both Linear voltage and serial communications outputs

03 Output Configuration

Pellistor-mimic bridge

100 mV

Mid-supply at zero; output rises with respect to the detector pin by 100 mV at range

TYPICAL USE

Direct replacement of a catalytic pellistor in existing circuitry

Linear voltage

0.4–2.0 V

0.4 V – 2.0 V over range with respect to the negative supply pin

TYPICAL USE

Voltage-input transmitters and controllers

Serial communications

Rx / Tx

Output read-out and internal configuration access (pads in the 3-pin version, pins in the 5-pin version)

TYPICAL USE

Calibration, configuration and diagnostics

All outputs formats are independent of supply polarity, so the sensor can be connected without observing polarity.

04 Package, Mounting and Handling



3-pin

Package version Rx
Rx / Tx as pads.



5-pin

Package version Rx
Rx / Tx as pins.



18.0g

All-metal construction Isolated
housing and small internal volume.



PCB sockets only

Connections must be made via PCB sockets only - soldering to the pins may seriously damage the sensor.

Recommended socket Wearnes Cambion
450-3326-01-06-00



Anti-static handling

The Prime range contains electrostaticsensitive components; observe anti-static handling precautions.

ESD

HANDLING PRECAUTIONS

05 Ordering Information

Please specify the following when placing an order:

01

Sensor model

PrimePell, PrimePellRP, Prime2,
Prime2RP, Prime3, Prime3RP

02

Pin configuration

3-pin version (Rx / Tx as pads) or 5-pin
version (Rx / Tx as pins)

03

Calibration gas and range

e.g. 0–100% LEL methane, 0–100% vol
methane, 0–5000 ppm CO₂, 0–100% vol
CO₂, 0–100% LEL acetylene

04

LEL basis (LEL methane calibrations only)

4.4% volume methane or 5% volume methane
– must be specified when ordering

05

Output format

Prime series Pellistor-mimic bridge or
linear voltage 0.4 V – 2.0 V, Reduce
Power series provides a linear voltage
output and serial communications

06

Quantities, accessories and documentation

Required quantities, PCB sockets (Wearnes
Cambion 450-3326-01-06-00), calibration
certificates and any application documenta-
tion

Custom requirements

For custom calibrations, quantities and lead times, please contact Clairair. The LEL basis for methane LEL calibrations (4.4% or 5% volume methane) depends on the geographic requirement and must be specified when ordering.

06 Common Specification


<60

Warm-up to operation


<30

Response time (T90)


>5years

MTBF

Test conditions: Unless otherwise stated, all data was taken using: supply voltage 3.5 V; ambient temperature 20 °C to 25 °C; ambient pressure 995 hPa to 1020 hPa; gases diluted in nitrogen; gas flow rate 1 litre/min across the sensor face.

PARAMETER	VALUE
Supply voltage range	3.0 V – 5.0 V
Power consumption – Prime series	280 mW typical
Power consumption – RP series (reduced power)	45 mW typical at 3.0 V supply (15 mA average typical operating current)
Default output range – pellistor mode	0 – 100 mV from mid-supply relative to detector pin
Default output range – voltage mode	0.4 V – 2.0 V
Warm-up time – to operation	< 60 s
Warm-up time – to specification	< 3 minutes
Response time (T90)	< 30 s to a step change in gas concentration
MTBF	> 5 years
Digital interface format	8 data bits, 1 stop bit, no parity
Digital interface baud rate	38 400 (default), 19 200, 9 600
Digital interface logic levels	VINL < 0.8 V / VINH > 2.0 V / VOL < 0.4 V / VOH > 2.4 V
Weight	18.0 grams
Vibration	Complies with EN 61779-1
Relative humidity	0 – 95 % RH, non-condensing
Operating temperature range	–30 °C to +50 °C
Storage temperature range	–40 °C to +80 °C
Operating pressure range	700 – 1300 hPa


Absolute maximum limits

Ambient temperature range

–40°C to +80°C

Supply voltage (pins 2 -3)

5.5V

07 Contact and Support

Technical support on implementation and application notes are available from Clairair Limited.


Clairair Ltd

Little Braxted Hall, Little Braxted, Witham,
Essex, CM8 3EU, U.K.

+44 (0)1376 516414

info@clairair.com

+44 (0)1376 516415

www.clairair.com

In the interest of continued product improvement Clairair Ltd reserves the right to change the design features and specifications without prior notification. The data contained in this document is for guidance only. Whilst Clairair Ltd has taken care to ensure the accuracy of the information in this document it accepts no responsibility for the consequences of any use of this document or the information contained within it.