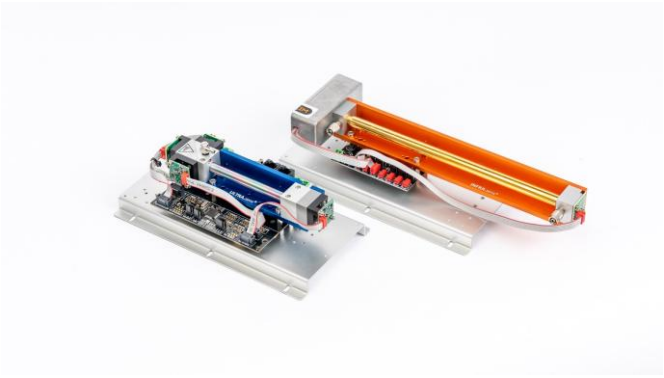
Quick Start Guide

OEM Gas Measurement Modules – From Unboxing to the First Reading in 8 Steps

INFRA.sens® · ULTRA.sens® · KOMBI.sens® · HUMI.sens® · O2.sens · Thermobox V5



INFORMATION

This quick start guide does not replace the operating manual

It summarizes the most important steps for initial setup. Before working with the gas measurement module, read the complete operating manual, especially Chapter 1, “Safety.” Product-specific values (measurement range, channel assignment, power supply) are listed in your module’s data sheet; in case of discrepancies, the data sheet takes precedence.

Safety at a Glance

WARNING

Explosion Hazard

The gas detection module is not an explosion-proof device.

- Do not use in potentially explosive atmospheres (Ex zones).
- Do not measure explosive gas mixtures.

WARNING

Leakage of toxic or corrosive gases (e.g., CO, H_2S)

- Connect the gas outlet to an exhaust system or exhaust pipe.
- Perform a leak test after connecting (Step 4).
- Before working on the gas line, flush it with ambient air or nitrogen for at least 10 minutes.

WARNING

Ultraviolet radiation (ULTRA.sens, KOMBI.sens)

UV-LED and EDL emitters: Risk Group 2 according to DIN EN 62471; hazard to eyes and skin.

- Do not look directly into the radiation source; turn off the radiation source before working on the beam path.

! NOTE

Incorrect voltage, reverse polarity, electrostatic discharge
The base board may be damaged.
- Check the voltage and polarity before turning on the power.
- Connect the interfaces first, then turn on the power supply.
- Touch electronic components only with ESD protection.

1 What You'll Need

The contents of the shipment are listed on the enclosed packing slip. Check the shipment for completeness and shipping damage. Report any visible damage to the delivery person immediately and keep the packaging.

Software and documentation are available for **download**—a USB flash drive is no longer included. You must provide the following yourself or order it as an accessory:

Part	Model / Part No.
24 VDC power supply, galvanically isolated	2003262 (Base Board V1.8.x, V1.9.x, Thermobox) · 2003137 (IR-compact V2.0.x)
RS232 data cable	2002204 (IR-compact) · 2001207 (V1.9.x and Thermobox) · 2000592 (V1.8.x)
USB/RS232 adapter	2001552 (alternatively CAN-USB adapter 2002089)
PC	Windows 10 or 11 with MARS® Tool Light (Step 6)
Gas lines	Hose, 4 mm inner diameter / 6 mm outer diameter, Viton or PTFE (for H_2O measurement, only PTFE or stainless steel)
Zero gas	Gas without any measurable components, e.g., nitrogen (N_2) 5.0
Sample preparation	Measurement gas cooler or Nafion™ tubing, particle filter < 0.1 µm, pump without pressure pulsation, flow meter

2 Unpacking and Acclimatization

1. Remove the module from the packaging. Do not touch the electronics (ESD).
2. Allow the module to reach room temperature before turning it on to prevent condensation from forming.
3. Do not remove the dust caps from the gas connections until immediately before connecting the gas lines.

Storage: dry, dust-free, in the original packaging, −20 to 60 °C (O2.sens optimal at 15–25 °C).

3 Installing the

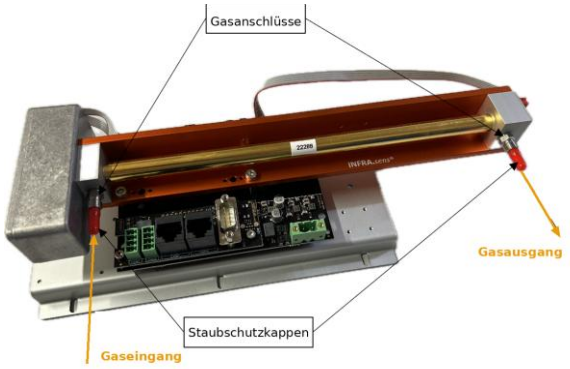
Environment	Requirements
Temperature	5–45 °C, as constant as possible
Relative humidity	< 95%, non-condensing
Installation Location	Dry, dust-free, no corrosive atmosphere, not outdoors without a protective enclosure, no hazardous area

1. Securely fasten the module using **6 M4 screws** through the holes in the mounting plate.
2. The optical bench (emitter, cuvette, detector) must not come into contact with any components other than the mounting plate (housing walls, cables, heat sources) and must not be exposed to vibrations—otherwise, measurement drift will occur.
3. Determine the installation orientation and do not change it afterward.
4. With O2.sens: Align the sensor vertically with the measuring surface facing downward.

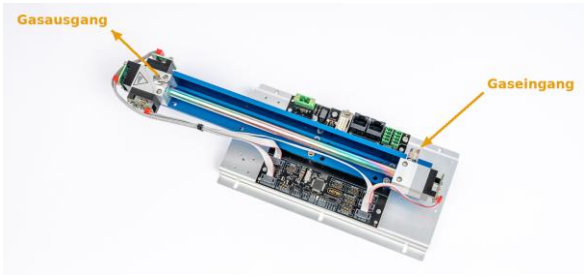
   ✓ **Result:** The module is mechanically secured. The installation position can shift the zero point—therefore, the zero point is adjusted in Step 8.

4 Connect the gas and perform a leak test

The **gas inlet is always on the detector side**, and the gas outlet **is** on the beam side. The module was calibrated in this orientation—be sure to maintain this orientation during adjustment and when introducing test gas.



INFRA.sens: Inlet on the left



ULTRA.sens: Inlet on the right

1. Remove the dust caps. Do not modify or replace the fittings.
2. Connect the sample gas line to the gas inlet and the exhaust gas line to the gas outlet. Keep the lines short (each meter of tubing increases the dead time by approximately 0.75 s at 1 l/min).
3. Install sample conditioning upstream: Dry the measurement gas (dew point < 5 °C), filter out particles (< 0.1 µm), and maintain a stable pressure.
4. Set the flow rate and keep it constant (see table for values). No fluctuating back pressure at the gas outlet.

Flow rate	Value
Permissible	0.1–1.5 l/min
during factory calibration	0.7–1 L/min
for adjustment	1 l/min

Leak test (recommended after connection)

1. Shut off the gas supply and tightly seal the gas outlet.
2. Connect nitrogen 5.0 to the gas inlet via the pressure regulator, shut-off valve, and pressure gauge (alternatively, use a hand pump with a pressure gauge).
3. Pressurize the gas line to **250 mbar**, shut off the supply, and monitor the pressure drop for 1 minute.
4. Remove the caps and reconnect the gas lines.

   ✓ **Result:** Pressure drop < 1 mbar/min – the gas line is leak-tight. Otherwise, check the fittings and repeat the test.

5 Connecting the 's electrical system

Operation	Power Supply	Current consumption
ULTRA.sens (Base Board V1.9.x)	24 VDC (15–30 V)	< 100 mA
INFRA.sens, Base Board V1.9.x / IR-compact V2.0.x	24 VDC (15–30 V / 9–30 V)	< 300 mA
KOMBI.sens	24 VDC (15–30 V)	< 400 mA
Thermobox V5 with heater	24 VDC (15–30 V)	min. 2 A (35 W)

Connection	Base Board V1.9.x	IR-compact V2.0.x	Thermobox V5
Power supply	X5: Pin 1 +24 V, Pin 2 GND	Power: Pin 1 +24 V, Pin 2 GND	24 VDC: Pin 1 +24 V, Pin 2 GND
RS232	CON3, D-Sub 9-pin female connector: Pin 2 TxD, 3 RxD, 5 GND	RS232, 3-pin: Pin 1 RxD, 2 TxD, 3 GND	RS232, D-Sub 9-pin female connector: Pin 2 TxD, 3 RxD, 5 GND
CAN bus (RJ45)	X1/X4: Pin 1 GND, 4 CAN-H, 5 CAN-L	–	–
CAN bus (terminal block)	X2/X3, 4-pin 3.5 mm: Pin 1 GND, 2 CAN-L, 3 CAN-H	CAN, 3-pin 2.54 mm: Pin 1 CAN-L, 2 CAN-H, 3 GND	CAN, 4-pin 3.5 mm: Pin 1 GND, 2 CAN-L, 3 CAN-H (Pin 1 on the right)

Base board V1.8.x and Modbus versions: see the operating manual, Chapter 7.3.

Wiring the CAN bus

- The two RJ45 jacks X1/X4 (V1.9.x) are connected in parallel—multiple modules can be daisy-chained using standard patch cables.
- A **120 Ω** terminating resistor must be active at **the first and last device**. It is integrated on the base board: for V1.9.x and IR-compact V2.0.x, it can be enabled via software; for V1.8.x, via jumper JP2.
- The baud rate (125 kBaud, 250 kBaud, 500 kBaud, 1 MBaud) and node ID or CAN IDs are configured via software (MARS® tool via RS232). Protocol and commands: Communication Manual.

1. Connect the data cable to the module's RS232 port and to the PC via the USB/RS232 adapter.
2. Connect the power supply—**do not turn it on yet**. Check the voltage and polarity.

! NOTE

Potential-free operation

- ▶ Use only galvanically isolated power supplies.
- ▶ Do not connect the housing or metal parts to the protective conductor (PE).
- ▶ Wire the UB− and GND supply lines of the communication interface separately—otherwise, compensation currents will flow.

6 Installing the

The MARS®-Tool light is used to read out measured values, for data logging, and for calibration on a PC. The latest version is available for

www.witec-sensorik.de/downloads/software/

. After filling out the form, you will receive the download link via email.

Download MARS®-Tool light

1. Download the software package, run the setup file, and install MARS®-Tool light (administrator privileges recommended).
2. Install the drivers for the USB/RS232 adapter and note the assigned COM port in Windows Device Manager.

Without the MARS® Tool, a terminal program (e.g., HTerm) is sufficient for simple queries: **115,200 baud, 8N1**. Commands: see the Communication Manual.

How to connect the module to the PC



Configuration A: INFRA.sens with IR-compact base board · B: ULTRA.sens with V1.9 base board · C: Gas measurement module in the Thermobox V5

7 Power On and Connect

1. Turn on the 24 VDC power supply.
2. Check that **LED2 is flashing at a rate of 1 Hz** and that **LED4** is lit **green** (detector signal is sufficient).
3. Launch the MARS®-Tool light, select the COM port, and establish a connection to the module.
4. Check the measured values and status byte.

   ✓ **Result:** The module is connected and providing measured values.

8 Warm-up and zero adjustment

Procedure	Waiting time before adjustment
without heating	at least 30 min under stable conditions (warm-up time < 15 min)
Heated (Thermobox, thermostatic control)	Until the setpoint temperature is reached, approx. 30 min starting at 25 °C; longer in colder conditions

1. Purge the entire measurement system with **zero gas** at a flow rate of 1 L/min.
2. Wait until the reading stabilizes (fluctuation < 1% of the full-scale value).
3. Set the zero point—in MARS®-Tool light, via an interface command, or using the external zero-point trigger (DIO1 connected to GND for at least 4 s).
4. Switch to measurement gas.

   ✓ **Result:** The display shows 0.00 ppm. The module is ready for operation.

INFORMATION

Suitable zero gas

The zero gas must not contain the substance being measured. Ambient air is unsuitable for CO_2 modules (approx. 400–1000 ppm CO_2)—use nitrogen (N_2) 2.8, or preferably 5.0. Endpoint calibration with test gas, recommended test intervals, and automatic zero calibration (AZF): Operating Instructions, Chapter 10.

? If something isn't working

Malfunction	Possible Cause	Solution
LED2 is not flashing	No power or incorrect power supply	Check voltage and polarity
No connection to the PC	Wrong COM port, wrong cable, cable too long (max. approx. 2 m at 115,200 baud), interface set to Modbus	Check COM port, use Wi.Tec data cable, check RS232/Modbus DIP switch
LED4 red	Detector signal below alarm level: Cell is dirty or fogged up, emitter is worn out	Check sample preparation; contact Wi.Tec service
Measured value drifts	Temperature, pressure, or flow rate unstable; condensation	Stabilize conditions, adjust zero point
Measured value fluctuates	Pump pressure pulsation, fluctuating back pressure, grounding issues	Check for pump pulsation, exhaust gas routing, and grounding
Slow response	Long lines, insufficient flow, adhering gases (SO_2, NO_2)	Shorten lines, increase flow rate, use PTFE tubing

Further Information and Contact

- **Operating Instructions:** Safety, Connections for All Base Boards, Calibration, Maintenance, Accessories (available from Wi.Tec-Sensorik; see below for contact information)
- **Module data sheet:** Measurement range, technical specifications, pin assignment (included with delivery)
- **Communication manual** and **MARS®-Tool light manual:** Download at www.witec-sensorik.de

Wi.Tec-Sensorik GmbH
Schepersweg 41–61 · 46485 Wesel · Germany
Phone +49 281 206578-20 · info@witec-sensorik.de · www.witec-sensorik.de