



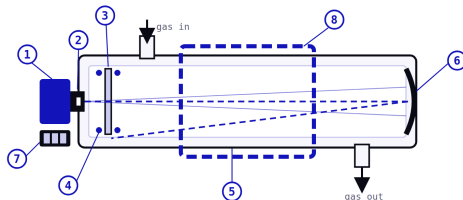
MULTI-CHANNEL PROCESS NDIR GAS ANALYZER · TWO ENCLOSURE VERSIONS

TRM-PGA

Heated stainless-steel optical cuvette, broadband solid-state IR emitter and multi-channel detector — 1 to 7 gas channels, ppm to 100 vol%. **TRM-PGA-R** 19" 3 U rack · **TRM-PGA-W** IP66 wall enclosure (Rittal)

PRINCIPLE & CONSTRUCTION

The **TRM-PGA** is a flow-through process gas analyzer based on **non-dispersive infrared absorption (NDIR)** in the mid-IR: each gas is measured at the wavelength of its vibrational absorption band (Lambert-Beer law), a reference wavelength passes unattenuated, and all channels are measured simultaneously by a multi-channel detector. Solid-state optics and electronics — **no moving parts**.



1 emitter · 2 emitter aperture · 3 protective window · 4 chemically resistant seals · 5 stainless-steel sample chamber · 6 focusing mirror, stainless steel · 7 multi-channel IR detector · 8 sample-chamber heater · dashed: IR beam and reference

Optical system — 1 emitter · 2 emitter aperture · 3 protective window · 4 chemically resistant seals · 5 stainless-steel sample chamber · 6 stainless-steel focusing mirror · 7 multi-channel IR detector · 8 chamber heater

What makes the reading stable

- **Heated, thermostatted cuvette** — resistive clamp heater under PID control with three temperature sensors (heater and detectors); no condensation on the optics, < 3 % of range per 10 °C.
- **Chemically resistant path** — stainless-steel chamber and mirror, seals rated to 250 °C; optional high-temperature version with the cuvette at 200 °C.
- **Cross-sensitivity handled in hardware and software** — measuring wavelengths chosen free of interfering bands; where impossible, extra correction channels; residual < 4 %.
- **Flow and pressure controlled** — 300–500 sccm throttled flow keeps the cuvette at ambient pressure, removing the pressure error term.
- **Twin-compensated detector** — internal and external thermal compensation; keep away from open flame and direct sunlight.

1–7 channels

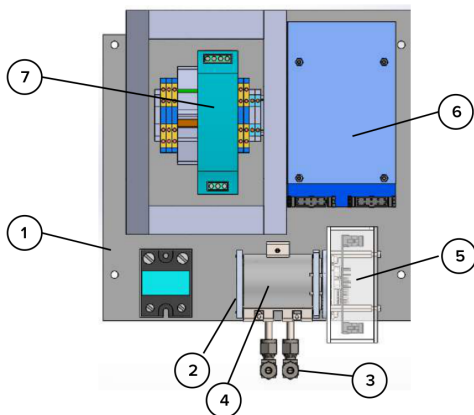
ppm → 100 vol%

T90 < 30 s

Modbus RTU / TCP

heated cuvette

ANALYZER MODULE



Analyzer module on its mounting plate — 1 mounting plate · 2 optical cuvette · 3 gas inlet / outlet flanges · 4 heater · 5 signal-acquisition board · 6 motherboard · 7 power supply

The same module is fitted in both enclosure versions: Analyzer module on mounting plate: 270 × 270 mm plate, height 118 mm; module length 250 mm; D6 mm compression fittings. Configurations: 1 to 7 measuring channels, 1 or 2 broadband emitters, up to 2 detectors per cuvette; 2–3 cuvettes in series for multi-range or long-path tasks.

Sample connection 6 mm compression fitting (Swagelok-type), stainless steel; 90° elbow supplied, straight fitting on request. Either flange may serve as inlet.

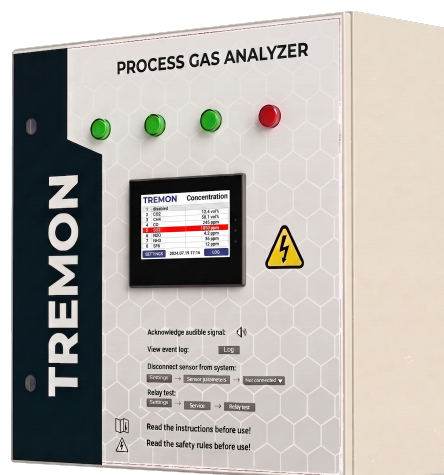
TWO ENCLOSURE VERSIONS – RITTAL

TRM-PGA-R • 19" RACK



Rittal Ripac Vario 3 U, 482.6 × 132.5 × 245 mm. plain front panel with the 7" touch-screen and the lamps POWER · STATUS · SERVICE · ALARM — the same readings / log / calibration pages as the GDC cabinet; all gas and electrical connections on the rear panel. For analyzer cabinets, CEMS racks and laboratory benches.

TRM-PGA-W • WALL-MOUNTED



Rittal AX compact enclosure 500 × 500 × 210 mm, IP 66. 7" touch-screen and four lamps in the door — the same operating concept as the GDC cabinet; sample fittings and cable glands on the bottom wall. For plant floors, biogas sites and outdoor shelters.



TRM-PGA-R rear panel — SAMPLE IN · SAMPLE OUT · PURGE / ZERO bulkhead fittings · RS-485 A/B/GND + D01/D02 · Modbus TCP (RJ45) · USB service · IEC inlet 100-240 V AC with switch and fuse · earth stud · nameplate

ENCLOSURE VERSIONS – COMPARISON

VERSION	TRM-PGA-R – 19" RACK	TRM-PGA-W – WALL-MOUNTED
Enclosure	Rittal Ripac Vario 3 U subrack, 482.6 mm (19"), RAL 7035 sheet steel; front panel with two rack handles	Rittal AX compact enclosure, sheet steel RAL 7035, single door with two cam locks, galvanised mounting plate
Dimensions (W × H × D)	482.6 × 132.5 × 245 mm (3 U)	500 × 500 × 210 mm
Ingress protection	IP 20 (indoor, cabinet-mounted)	IP 66 (IEC 60529) · NEMA 4 / 12
Display & operation	7" colour touch-screen on the front panel (readings, log, calibration); lamps POWER · STATUS · SERVICE · ALARM	7" colour touch-screen in the door (readings, log, calibration); four door lamps: 3 × status, 1 × alarm; audible-signal acknowledge
Sample connections	rear panel — SAMPLE IN · SAMPLE OUT · PURGE / ZERO, 6 mm stainless compression bulkhead fittings	bottom wall — SAMPLE IN · SAMPLE OUT, 6 mm stainless compression bulkhead fittings
Electrical connections	rear panel — IEC C14 inlet with switch and fuse, RS-485 A/B/GND + DO1/DO2 pluggable terminal, RJ45 Modbus TCP, USB-B service	bottom wall — two cable glands (mains, signal); internal terminals and circuit-breaker Q1 on the mounting plate
Mounting	19" rack, 4 slots; rack slides optional	4 wall fixings; min. 700 mm above floor; service access ≥ 800 mm
Mass	≈ 7 kg	≈ 21 kg (enclosure 15 kg + module)

Enclosure article numbers and IP ratings per Rittal catalogue (AX 1050.000 – 500×500×210 mm, IP 66; Ripac Vario 3 U, depth 245 mm). Other AX / Ripac sizes, purge/pressurisation and Ex-p versions on request.

INTERFACES & DIAGNOSTICS

Digital

- RS-485 Modbus RTU, slave, 9600 bd, 8N1, address 1 (configurable); functions 03 / 06 / 16, up to 20 registers per frame
- Ethernet Modbus TCP
- USB-B service port for the Tremon TGA configuration software (Windows 7 or later)
- µSD card — configuration and event log; CR2032 for RTC
- 2 open-collector digital outputs (DO1 / DO2)

Self-diagnostics

- Status register 2000: IR sources 1/2, detectors 1/2, optics-clean flag, RTD, zero-calibration flag, heater
- 8 on-board LEDs: emitter activity, RS-485, X2X, heater PWM / RTD / cleaning, supplies, CPU, SD
- Touch-screen: readings, event log, zero / span calibration pages
- Automatic zero on nitrogen purge via the PURGE / ZERO port; span with calibration gas via registers 1000 / 160 / 161 / 159

■ TECHNICAL DATA – ANALYZER

Measuring principle	NDIR — non-dispersive infrared absorption, mid-IR; broadband solid-state emitter, multi-channel detector
Measuring channels	1 to 7 gas channels per cuvette (up to 8 registers); 1 or 2 IR emitters, up to 2 detectors per cuvette
Optical cuvette	stainless steel, chemically resistant seals to 250 °C; heated, thermostatted (3 temperature sensors)
Sample connection	6 mm compression fitting (Swagelok-type), stainless steel; 90° elbow supplied, straight on request; either flange may be inlet
Sample pressure	0.9 – 1.1 bar abs
Sample flow	300 – 600 sccm (recommended 300 – 500 sccm)
Sample temperature	< 90 °C, stable within 3 °C
Sample quality	ISO 8573-1:2001 class 2 — particles ≤ 5 µm, ≤ 10 particles/m ³ ; oil ≤ 0.1 mg/m ³ ; dew point –40 °C
Detection limit	< 2 % of range
Cross-sensitivity	< 4 % (software-corrected; free wavelengths or extra correction channels)
Linearity	≤ ±2 %
Response time	T90 < 30 s (NH ₃ : T90 < 40 s)
Temperature influence	< 3 % of range per 10 °C (thermostatted cuvette)
Zero drift	automatic periodic purge and zero recommended (every 2 weeks)
Interfaces	RS-485 Modbus RTU (slave, 9600 bd, 8N1, addr. 1) · Ethernet Modbus TCP · USB-B service port · µSD (configuration & log)
Outputs	2 open-collector digital outputs · PID-controlled solid-state relay for heater · X2X bus for Tremon extension modules
Power supply	220 V AC ±10 %, 48 – 62 Hz, single-phase; internal 24 V DC supply
Power consumption	max. 250 W with heater on
Operating temperature	+10 ... +30 °C (electronics); storage –25 ... +60 °C
Relative humidity	< 75 %
Special versions	high-temperature — cuvette heated to 200 °C · 2–3 cuvettes in series · alternative wetted materials · ¼" Swagelok / PTFE

MEASURING RANGES

Standard full-scale ranges per channel. Any range within the list can be combined across the 1–7 channels of one cuvette; other gases and ranges on request. Ranges follow the smartGAS FLOWEVO NDIR catalogue (September 2026) to keep TRM-PGA interchangeable in existing process-measurement designs.

GAS	NAME	STANDARD MEASURING RANGES (FULL SCALE)
CO ₂	Carbon dioxide	100 · 500 · 1000 · 2000 · 5000 · 10 000 ppm · 2 · 5 · 10 · 20 · 30 · 50 · 100 vol%
CO	Carbon monoxide	2000 · 5000 · 10 000 ppm · 2 · 5 · 10 · 15 · 20 · 30 · 50 · 100 vol%
CH ₄	Methane	2000 · 5000 · 10 000 ppm · 2.5 · 5 · 10 · 15 · 50 · 100 vol%
SF ₆	Sulfur hexafluoride	50 · 1000 · 2000 · 5000 ppm · 100 vol%
N ₂ O	Nitrous oxide	500 ppm
SO ₂	Sulfur dioxide	2000 ppm
C ₂ H ₄	Ethylene	2000 ppm
SO ₂ F ₂	Sulfuryl fluoride	100 ppm · 4 · 6 vol%
CH ₃ Br	Methyl bromide	5.8 · 35 vol%
NH ₃	Ammonia	200 · 1000 ppm
CO ₂ in Ar	Carbon dioxide in argon	30 · 50 vol%
Biogas	CH ₄ / CO ₂	CH ₄ 5 · 50 · 100 vol% · CO ₂ 5 · 50 · 100 vol%

Honest boundary. NDIR cannot detect monoatomic (inert) gases or symmetric diatomic molecules – N₂, O₂, H₂. For O₂ and H₂ use the electrochemical / thermocatalytic channels of the TRM-EX analyzer.

PGA

CONTACT

Tremon Solutions

Havensingel 100, 5611 VT Eindhoven, The Netherlands
sales@tremon.nl · www.tremon.nl
KVK 95114289 · BTW-ID NL005130552B15