

EX-TEC[®] PM 580/550/500/400

Technical Data Sheet

Device data	
Dimensions (W x D x H)	<ul style="list-style-type: none"> • 93 x 47 x 165 mm (3.7 x 1.9 x 6.5 inches) • 93 x 65 x 165 mm (3.7 x 2.6 x 6.5 inches) incl. belt clip
Weight	depends on the built-in sensors <ul style="list-style-type: none"> • approx. 500 g (14.2 oz) • approx. 523 g (14.8 oz) incl. belt clip
Material	housing: polycarbonate, thermoplastic polyurethane

Certificates	
Certificate	explosion protection test <ul style="list-style-type: none"> • EU type-examination certificate: TÜV 17 ATEX 171969 X • IECEx: IECEx TUN 17.0027 X functional safety test <ul style="list-style-type: none"> • for: <ul style="list-style-type: none"> ◦ Warning application; gas types CH₄, C₃H₈, C₉H₂₀ (PM 400 only); gas CO₂, O₂, CO, H₂S ◦ Structure application; gas types CH₄, C₃H₈; gas CO • EU type-examination certificate/type-examination certificate: DEKRA Testing and Certification GmbH: <ul style="list-style-type: none"> ◦ BVS 19 ATEX G 002 X ◦ PFG 19 G 004 X
Marking	<ul style="list-style-type: none"> • I M1 Ex ia da I Ma • II2G Ex ia db eb IIC T4 Gb • II2G Ex ia db IIC T4 Gb

Features	
Gas connections	Rectus NW 2.7 quick-release coupling
Display	TFT display, 380 × 224 pixels, size 56 x 33 mm
Buzzer	<ul style="list-style-type: none"> • frequency: 2.4 kHz • volume: 80 dB (A) / 30 cm
Signal light	red
Pump	diaphragm pump <ul style="list-style-type: none"> • vacuum: > 150 mbar • volume flow: > 10 l/h • pump error (F100): ≤ 5 l/h
Interface	USB 2.0 <ul style="list-style-type: none"> • docking station PM 5 or PM 5-T required
Memory	8 MB
Control	membrane keypad
Sensors	PM 580/550/500: <ul style="list-style-type: none"> • – IR for flammable gases (CH₄, C₃H₈) optional: <ul style="list-style-type: none"> • IR for CO₂ • EC for O₂, CO, H₂S PM 580 plus: <ul style="list-style-type: none"> • SC for flammable gases (CH₄, C₃H₈) PM 400 <ul style="list-style-type: none"> • CC for flammable gases (CH₄, C₃H₈, C₉H₂₀, C₂H₂, H₂, JFuel) optional: <ul style="list-style-type: none"> • IR for CO₂ • EC for O₂, CO
Filter	can be changed: <ul style="list-style-type: none"> • hydrophobic filter • dust filter

Operating conditions	
Operating temperature	-20 – 40 °C (-4 to 104 °F)
Humidity	5 – 95% r.h., non-condensing <ul style="list-style-type: none"> • short term: 0% r.h.
Atmospheric pressure	700 – 1,200 hPa <ul style="list-style-type: none"> • pressure compensation for IR sensor
Pressure at gas inlet	max. 30 hPa (millibar)
Protection rating	IP65

Storage conditions	
Storage temperature	<ul style="list-style-type: none"> • devices without an EC sensor: -25 – 60 °C (-13 to 140 °F) • devices with an EC sensor: -25 – 40 °C (-4 to 104 °F)
Humidity	5 – 95% r.h., non-condensing
Atmospheric pressure	700 – 1,200 hPa

Power supply	
Power supply	3 cells, type Mignon AA, optionally: <ul style="list-style-type: none"> disposable batteries: alkaline rechargeable batteries: NiMH 2500 mAh alternatively: <ul style="list-style-type: none"> PM 5 battery pack
Operating time, typical	at 25 °C (77 °F) depending on the product variant and application <ul style="list-style-type: none"> PM 580/550/500, Warning application: 16 h PM 580/550, Measuring application: 11 h PM 580, Structure application: 8 h PM 400, Warning application: 11 h PM 400 with IR for CO₂, Warning application: 9 h <p>the times apply only when no alarm is triggered during operation.</p>
Battery voltage	<ul style="list-style-type: none"> NiMH: 3 × 1.2 V alkaline: 3 × 1.5 V
Charging time	approx. 5 h (fully charged) at 2500 mAh
Charging temperature	0 – 35 °C (32 to 95 °F)
Charging voltage	12 VDC
Charging current	max. 300 mA
Charger	<ul style="list-style-type: none"> AC/DC adapter M4 vehicle cable M4

Data transmission	
Communication	USB 2.0

Gas types	
Default	CH ₄
Optional	PM 580/550/500: C ₃ H ₈ PM 400: C ₃ H ₈ , C ₉ H ₂₀ , C ₂ H ₂ , H ₂ , JFuel

Sensors

Note:

When using probes, the specified response times are longer.

Note for EC sensors:

At temperatures below 0 °C (32 °F) the specified response times and decay times may be longer.

Methane CH₄, propane C₃H₈ (Warning application)	
Type	infrared sensor (IR)
Use	PM 580/550/500
Measuring range	0 – 100% LEL <ul style="list-style-type: none"> • CH₄: 0 – 4.40% vol. (adjustable 4.00 – 5.00% vol.) • C₃H₈: 0 – 1.70% vol. (adjustable 1.50 – 2.10% vol.)
Resolution	<ul style="list-style-type: none"> • CH₄: 1% LEL or 0.05% vol. • C₃H₈: 1% LEL or 0.02% vol.
Response times	<ul style="list-style-type: none"> • CH₄: t₅₀ < 13 s t₉₀ < 25 s • C₃H₈: t₅₀ < 15 s t₉₀ < 28 s
Warm-up time	< 120 s
Temperature range	-20 – 40 °C (-4 to 104 °F)
Measuring error	according to EN 60079-29-1 <ul style="list-style-type: none"> • CH₄: ±1% LEL (short-term stability), ±4% LEL (long-term stability) • C₃H₈: ±1% LEL (short-term stability), ±2% LEL (long-term stability)
Interference	all hydrocarbons
Humidity	5 – 95% r.h., non-condensing <ul style="list-style-type: none"> • short term: 0% r.h.
Lifetime	24 months (60 months expected)
Test gases	<ul style="list-style-type: none"> • zero point: clean air • CH₄: 2.20% vol. • C₃H₈: 1.00% vol.
Humidity gas/test gas	5 – 95% r.h., non-condensing <ul style="list-style-type: none"> • short term: 0% r.h. • error: ±9% of the end of measuring range
Pressure	700 – 1,200 hPa <ul style="list-style-type: none"> • error: ±2% of the end of measuring range

Methane CH₄, propane C₃H₈ (Measuring application)	
Type	infrared sensor (IR)
Use	PM 580/550
Measuring range	0.0 – 100% vol.
Resolution	<ul style="list-style-type: none"> • 0 – 9.9% vol.: 0.1% vol. • 10 – 100% vol.: 1% vol.
Response times	<ul style="list-style-type: none"> • CH₄: t₅₀ < 13 s t₉₀ < 23 s • C₃H₈: t₅₀ < 15 s t₉₀ < 28 s
Warm-up time	< 120 s
Temperature range	-20 – 40 °C (-4 to 104 °F)
Measuring error	<ul style="list-style-type: none"> • CH₄: <ul style="list-style-type: none"> ◦ to 4.4% vol.: ±10% of measured value (linearity), at least ±0.2% vol. ◦ 4.4% vol. – 9.9% vol.: ±10% of measured value (linearity), at least ±0.5% vol. ◦ 10% vol. – 100% vol.: ±3% of measured value (linearity), at least ±2% vol. • C₃H₈ <ul style="list-style-type: none"> ◦ to 1.7% vol.: ±10% of measured value (linearity), at least ±0.2% vol. ◦ 1.7% vol. – 100% vol.: ±5% of measured value (linearity), at least ±0.5% vol.
Interference	all hydrocarbons
Humidity	5 – 95% r.h., non-condensing <ul style="list-style-type: none"> • short term: 0% r.h.
Lifetime	24 months (60 months expected)
Test gases	<ul style="list-style-type: none"> • zero point: clean air • CH₄: 100% vol. • C₃H₈: 100% vol. setting ranges: <ul style="list-style-type: none"> • CH₄: 50 – 100% vol. • C₃H₈: 50 – 100% vol.

Methane CH4 (Structure application)	
Type	infrared sensor (IR)
Use	PM 580
Measuring range	0 – 100% vol.
Resolution	<ul style="list-style-type: none"> • 0.00 – 4.40% vol.: 0.05% vol. • 4.5 – 9.9% vol.: 0.1% vol. • 10 – 100% vol.: 1% vol.
Response times	t50 < 13 s t90 < 23 s
Warm-up time	< 120 s
Temperature range	-20 – 40 °C (-4 to 104 °F)
Measuring error	±3% of measured value (linearity)
Interference	all hydrocarbons
Humidity	5 – 95% r.h., non-condensing • short term: 0% r.h.
Lifetime	24 months (60 months expected)
Test gases	<ul style="list-style-type: none"> • zero point: clean air • CH4: 100% vol. setting ranges: <ul style="list-style-type: none"> • CH4: 50 – 100% vol.

Propane C3H8 (Structure application)	
Type	infrared sensor (IR)
Use	PM 580
Measuring range	0 – 1.70% vol.
Resolution	0.02% vol.
Response times	t50 < 15 s t90 < 28 s
Warm-up time	< 120 s
Temperature range	-20 – 40 °C (-4 to 104 °F)
Measuring error	±5% of measured value (linearity)
Interference	all hydrocarbons
Humidity	5 – 95% r.h., non-condensing • short term: 0% r.h.
Lifetime	24 months (60 months expected)
Test gases	<ul style="list-style-type: none"> • zero point: clean air • C3H8: 1.00% vol.

Carbon dioxide CO2 (Warning application)	
Type	infrared sensor (IR)
Use	PM 580/550/500/400
Measuring range	0 – 5.00% vol.
Indication range	-0.50 – 5.00% vol.
Resolution	0.02% vol.
Response times	t50 ≤ 15 s t90 ≤ 30 s
Decay times	t10 ≤ 23 s t50 ≤ 13 s
Warm-up time	< 120 s
Stabilisation time	≤ 80 s
Temperature range	-20 – 40 °C (-4 to 104 °F)
Measuring error	<ul style="list-style-type: none"> • ±3% of measured value (linearity), at least ±0.04% vol. • ±0.04% vol. (long-term stability) as per EN 45544
Drift	≤ 0.05% vol. per month
Zero point deviation	0.04% vol.
Interference	none
Humidity	5 – 95% r.h., non-condensing <ul style="list-style-type: none"> • short term: 0% r.h. • error: ≤ 5% of measured value, at least ±0.04% vol.
Lifetime	24 months (60 months expected)
Test gases	<ul style="list-style-type: none"> • zero point: clean air <ul style="list-style-type: none"> ◦ use a CO2 filter! • sensitivity: 2.00% vol. CO2 setting ranges: <ul style="list-style-type: none"> • CO2: 1.00 – 2.50% vol. humidity: short-term 0% r.h.
Pressure	700 – 1,200 hPa <ul style="list-style-type: none"> • error: ≤ 5% of measured value, at least ±0.04% vol.

Methane CH₄, propane C₃H₈ (Structure application)	
Type	gas-sensitive semiconductor (SC)
Use	PM 580
Measuring range	<ul style="list-style-type: none"> • CH₄: 0 – 4000 ppm for LEL 4.40% vol. • C₃H₈: 0 – 1500 ppm for LEL 1.70% vol.
Resolution	1/2/20/200 ppm
Response times	<ul style="list-style-type: none"> • CH₄: 100 ppm: t₅₀ < 7 s t₉₀ < 10 s 1000 ppm: t₅₀ < 5 s t₉₀ < 8 s • C₃H₈: 3000 ppm: t₅₀ < 8 s t₉₀ < 11 s <p>when using the SPE Autoflow: the response times can be extended by up to 4 s as additional volume must be passed through (test gas hose, conditioner).</p>
Warm-up time	< 120 s
Temperature range	-20 – 40 °C (-4 to 104 °F)
Measuring error	for measurement values > 100 ppm under the same ambient conditions: <ul style="list-style-type: none"> • CH₄: ±20% of measured value (linearity) • C₃H₈: ±20% of measured value (linearity)
Interference	<ul style="list-style-type: none"> • all hydrocarbons • H₂ • water vapour
Lifetime	12 months (60 months expected)
Test gases	<p>use the conditioner for all test gases!</p> <ul style="list-style-type: none"> • zero point: clean air • CH₄: 1000 ppm in synth. air • C₃H₈: 0.3 ppm in synth. air <p>setting ranges:</p> <ul style="list-style-type: none"> • CH₄: 100 – 1000 ppm • C₃H₈: 100 – 3000 ppm

Methane CH₄, propane C₃H₈, nonane C₉H₂₀, acetylene C₂H₂, hydrogen H₂, JFuel (kerosene)	
Type	catalytic combustion sensor (CC)
Use	PM 400
Measuring range	0 – 100% LEL <ul style="list-style-type: none"> • CH₄: 0 – 4.40% vol. (adjustable 4.00 – 5.00% vol.) • C₃H₈: 0 – 1.70% vol. (adjustable 1.50 – 2.10% vol.) • C₉H₂₀: 0 – 0.70% vol. • C₂H₂: 0 – 2.30% vol. • H₂: 0 – 4.00% vol. • JFuel: 0 – 0.70% vol.
Resolution	<ul style="list-style-type: none"> • CH₄: 1% LEL or 0.05% vol. • C₃H₈: 1% LEL or 0.02% vol. • C₉H₂₀: 2% LEL or 0.02% vol. • C₂H₂: 2% LEL or 0.05% vol. • H₂: 1% LEL or 0.05% vol. • JFuel: 2% LEL or 0.02% vol.
Response times	<ul style="list-style-type: none"> • CH₄: t₅₀ < 7 s t₉₀ < 13 s • C₃H₈: t₅₀ < 7 s t₉₀ < 13 s • C₉H₂₀: t₅₀ < 23 s t₉₀ < 3 min • C₂H₂: t₅₀ < 6 s t₉₀ < 10 s • H₂: t₅₀ < 6 s t₉₀ < 11 s • JFuel: t₅₀ < 15 s t₉₀ < 60 s
Warm-up time	< 120 s
Temperature range	-20 – 40 °C (-4 to 104 °F)
Measuring error	<p>according to EN 60079-29-1</p> <ul style="list-style-type: none"> • CH₄: ±1% LEL (short-term stability) ±4% LEL (long-term stability) • C₃H₈: ±2% LEL (short-term stability) ±2% LEL (long-term stability) • C₉H₂₀: ±2% LEL (short-term stability) ±8% LEL (long-term stability) • C₂H₂: ±1% LEL (short-term stability) ±4% LEL (long-term stability) • H₂: ±1% LEL (short-term stability) ±2% LEL (long-term stability) • JFuel: ±2% LEL (short-term stability) ±8% LEL (long-term stability) <p>when using a substitute test gas:</p> <ul style="list-style-type: none"> • C₉H₂₀: ±30% of the measured value • JFuel: ±30% of the measured value
Interference	all flammable gases
Humidity	5 – 95% r.h., non-condensing <ul style="list-style-type: none"> • short term: 0% r.h.
Lifetime	24 months (60 months expected)

Test gases	<ul style="list-style-type: none"> • zero point: clean air • CH₄: 2.20% vol. in synth. air • C₃H₈: 1.00% vol. in synth. air • C₉H₂₀: 0.22% vol. in synth. air (substitute test gas 0.30% vol. C₃H₈ in synth. air) • C₂H₂: 1.00% vol. in synth. air • H₂: 2.00% vol. in synth. air • JFuel: 0.32% vol. in synth. air (substitute test gas 0.30% vol. C₃H₈ in synth. air) <p>setting ranges:</p> <ul style="list-style-type: none"> • CH₄: 1.00 – 3.50% vol. • C₃H₈: 0.50 – 1.30% vol. • C₉H₂₀: 0.20 – 0.50% vol. • C₂H₂: 0.50 – 1.80% vol. • H₂: 1.00 – 3.20% vol. • JFuel: 0.20 – 0.50% vol.
Humidity gas/test gas	<p>5 – 95% r.h., non-condensing</p> <ul style="list-style-type: none"> • short term: 0% r.h. • error: ±5% of the end of measuring range
Pressure	<p>700 – 1,200 hPa</p> <p>error:</p> <ul style="list-style-type: none"> • CH₄: 800 – 1200 hPa (millibar) ±3% of the end of measuring range 700 – 1,200 hPa ±4% of the end of measuring range • C₃H₈: 800 – 1200 hPa (millibar) ±2% of the end of measuring range 700 – 1,200 hPa ±2% of the end of measuring range

Oxygen O₂	
Type	electrochemical sensor (EC)
Use	PM 580/550/500/400
Measuring range	0 – 25.0% vol.
Indication range	-3 – 25.0% vol.
Resolution	0.1% vol.
Response times	t ₂₀ < 10 s t ₉₀ < 32 s
Warm-up time	< 2 min
Stabilisation time	< 90 s
Temperature range	-20 – 40 °C (-4 to 104 °F)
Drift	≤ 3% within 3 months
Interference	none
Humidity	<p>5 – 95% r.h., non-condensing</p> <ul style="list-style-type: none"> • short term: 0% r.h.
Lifetime	24 months (60 months expected)
Test gases	<ul style="list-style-type: none"> • zero point: clean air • O₂: 0.0% vol. <p>setting ranges:</p> <ul style="list-style-type: none"> • O₂: 0.0 – 1.0% vol.
Humidity gas/test gas	<p>5 – 95% r.h., non-condensing</p> <ul style="list-style-type: none"> • short term: 0% r.h. • error: ±3% of the end of measuring range
Pressure	<p>700 – 1,200 hPa</p> <ul style="list-style-type: none"> • error: ±3% of the end of measuring range

Carbon monoxide CO	
Type	electrochemical sensor (EC)
Use	PM 580/550/500/400
Measuring range	0 – 300 ppm
Indication range	-30 – 300 ppm
Resolution	1 ppm
Response times	t ₅₀ ≤ 12 s t ₉₀ ≤ 26 s
Decay times	t ₁₀ ≤ 27 s t ₅₀ ≤ 14 s
Warm-up time	2 min
Stabilisation time	≤ 2 min
Temperature range	-20 – 40 °C (-4 to 104 °F)
Measuring error	<ul style="list-style-type: none"> • ±3% of measured value (linearity), at least ±3 ppm (±3 digits) • ±5 ppm (long-term stability) as per EN 45544
Drift	< 10% within 6 months
Zero point deviation	±3 ppm
Interference	at 20 °C <ul style="list-style-type: none"> • 400 ppm H₂: < 70 ppm • 20 ppm H₂S: < 0.1 ppm • 100 ppm C₂H₂: < 200 ppm • 400 ppm C₂H₄: < 100 ppm • 100 ppm NO: < 50 ppm
Humidity	5 – 95% r.h., non-condensing <ul style="list-style-type: none"> • short term: 0% r.h. • error: ≤ 5% of measured value, at least ±3 ppm (±3 digits)
Lifetime	24 months (36 months expected)
Test gases	<ul style="list-style-type: none"> • zero point: clean air • sensitivity: 40 ppm CO setting ranges: <ul style="list-style-type: none"> • CO: 10 – 50 ppm humidity: short-term 0% r.h.
Pressure	700 – 1,200 hPa <ul style="list-style-type: none"> • error: ≤ 6% of measured value, at least ±3 ppm (±3 digits)

Hydrogen sulphide H2S	
Type	electrochemical sensor (EC)
Use	PM 580/550/500
Measuring range	0 – 50.0 ppm
Indication range	-10 – 100 ppm
Resolution	0.5 ppm
Response times	t50 ≤ 12 s t90 ≤ 29 s
Decay times	t10 ≤ 28 s t50 ≤ 14 s
Warm-up time	< 120 s
Stabilisation time	≤ 2 min
Temperature range	-20 – 40 °C (-4 to 104 °F)
Measuring error	<ul style="list-style-type: none"> • ±3% of measured value (linearity), at least ±3 ppm (±6 digits) • ±2 ppm (long-term stability) as per EN 45544
Drift	≤ 15% within 6 months
Zero point deviation	±2 ppm
Interference	at 25 °C (77 °F) <ul style="list-style-type: none"> • 400 ppm H2: < 1 ppm H2S • 400 ppm CO: < 1.5 ppm H2S • 100 ppm C2H2: < 2 ppm H2S • 400 ppm C2H4: < 0.1 ppm H2S • 50 ppm NO: < 12 ppm H2S • 10 ppm NO2: < -25 ppm H2S
Humidity	5 – 95% r.h., non-condensing <ul style="list-style-type: none"> • short term: 0% r.h. • error: ≤ 5% of measured value, at least ±2 ppm (±4 digits)
Lifetime	24 months (36 months expected)
Test gases	<ul style="list-style-type: none"> • zero point: clean air • sensitivity: 40 ppm H2S setting ranges: <ul style="list-style-type: none"> • H2S: 10.0 – 50.0 ppm humidity: short-term 0% r.h.
Pressure	700 – 1,200 hPa <ul style="list-style-type: none"> • error: ≤ 4% of measured value, at least ±2 ppm (±4 digits)

COSH: Carbon monoxide CO and hydrogen sulphide H2S	
Type	electrochemical sensor (EC)
Use	PM 580/550/500
Measuring range	<ul style="list-style-type: none"> • CO: 0 – 300 ppm • H2S: 0 – 50.0 ppm
Indication range	<ul style="list-style-type: none"> • CO: -30 – 300 ppm • H2S: -10 – 100 ppm
Resolution	<ul style="list-style-type: none"> • CO: 1 ppm • H2S: 0.5 ppm
Response times	<ul style="list-style-type: none"> • CO: t50 ≤ 11 s t90 ≤ 28 s • H2S: t50 ≤ 11 s t90 ≤ 27 s
Decay times	<ul style="list-style-type: none"> • CO: t10 ≤ 28 s t50 ≤ 14 s • H2S: t10 ≤ 27 s t50 ≤ 13 s
Warm-up time	< 120 s
Stabilisation time	≤ 2 min
Temperature range	-20 – 40 °C (-4 to 104 °F)
Measuring error	<ul style="list-style-type: none"> • ±3% of measured value (linearity), at least ±6 ppm (±6 digits) • ±5 ppm (long-term stability) as per EN 45544
Drift	≤ 10% within 6 months
Zero point deviation	<ul style="list-style-type: none"> • CO: ±2 ppm • H2S: ±2 ppm
Interference	at 20 °C <ul style="list-style-type: none"> • 400 ppm H2: < 55 ppm CO, < 1 ppm H2S • 400 ppm CO: < 2 ppm H2S • 40 ppm H2S: ≤ 4 ppm CO • 100 ppm C2H2: < 200 ppm CO, < 2 ppm H2S • 50 ppm NO: < 50 ppm CO, < 10 ppm H2S
Humidity	5 – 95% r.h., non-condensing <ul style="list-style-type: none"> • short term: 0% r.h. error: <ul style="list-style-type: none"> ◦ CO: ≤ 5% of measured value, at least ±7 ppm (±7 digits) ◦ H2S: ≤ 5% of measured value, at least ±2 ppm (±4 digits)
Lifetime	24 months (36 months expected)
Test gases	<ul style="list-style-type: none"> • zero point: clean air • sensitivity: 40 ppm CO 40 ppm H2S setting ranges: <ul style="list-style-type: none"> • CO: 10 – 50 ppm • H2S: 10.0 – 50.0 ppm humidity: short-term 0% r.h.
Pressure	700 – 1,200 hPa <ul style="list-style-type: none"> error: • CO: ≤ 5% of measured value, at least ±3 ppm (±3 digits) • H2S: ≤ 5% of measured value, at least ±2 ppm (±4 digits)

Subject to technical changes.