



VARIOTEC® 660

Series

Type/model	065 40
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Certificates

Certificate	explosion protection test EU type examination certificate: TÜV 07 ATEX 553353 X
Marking	II 2G Ex db eb ib IIC T4 Gb

Device data

Dimensions (W × D × H)	- approx. 148 × 57 × 205 mm (5.83 x 2.24 x 8.07 in) - approx. 148×57×253 mm (5.83 x 2.24 x 9.96 in) with supporting bracket
Weight	approx. 1000 g (35 oz)
Material	housing: polycarbonate

Features

Display	monochrome, 320×240 pixels
Buzzer	- frequency: 2.4 kHz - volume: 80 dB (A) / 1 m (3.28 ft)
Signal light	red
Pump	- vacuum: > 250 mbar - volume flow: typically 50 l/h ±20 l/h - inspection above ground, measuring in bar holes, gas measuring, plants applications: approx. 50 l/h - structure application: approx. 40 l/h - ethane analysis application during sampling: approx. 50 l/h - pump error (F100) depending on volume flow: ≤ 20 l/h F100 certain > 20 l/h – ≤ 35 l/h F100 possible
Interface	USB 2.0 Type B
Memory	8 MB
Control	- ON/OFF key 3 function keys - jog dial
Sensors	- SC for CH₄, H₂ - IR for CH₄ - TC for H₂
Filter	replaceable dust filter

Operating conditions

Operating temperature	-20 – 40°C (-4 – 104 °F)
Humidity	5 – 90 % r.h., non-condensing
Atmospheric pressure	800 – 1100 hPa
Pressure at gas input	max. 100 mbar
Protection rating	IP54
Position of use	any

Storage conditions

Storage temperature	-25 – 60°C (-13 °F – 140 °F) temperatures above 40°C (104 °F) reduce the lifetime of the rechargeable batteries.
Humidity	5 – 90 % r.h., non-condensing
Atmospheric pressure	800 – 1100 hPa

Power supply

Power supply	4 cells, type Mignon AA, optionally: • rechargeable batteries: NiMH • disposable batteries: alkaline
Operating time, typical	min. 7 h
Charging time	approx. 3 h (full charge), depending on capacity
Charging temperature	0 – 35°C (32 – 95 °F)
Charging voltage	12 V DC (max. 1 A)

Data transmission

Communication	USB 2.0 Type B
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Gas types

Default	• CH₄ • H₂
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Sensors

Note:

When using probes, the specified response times are extended.

Methane CH₄ (Measuring in bar holes, Gas measuring applications)

Type	infrared sensor (IR)	
Measuring range	0 – 100% vol.	
Indication range	0 – 120% vol.	
Resolution	0 – 10% vol. 10 – 100% vol.	0.1% vol. 1% vol.
Response times	100% vol.	t ₉₀ < 10 s
Warm-up time	< 30 s	
Temperature range	-20 – 40°C (-4 – 104 °F)	
Measuring error	- CH₄: ±5% of the measured value, minimum 1% vol. - C_xH_y: > ±5% of the measured value, minimum 1% vol.	
Interference, known	all hydrocarbons	
Lifetime, expected	5 years	
Test gases	- zero point: clean air - CH₄: 1.0% vol. in synth. air 100% vol.	

Hydrogen H₂ (Measuring in bar holes, Gas measuring applications)

Type	thermal conductivity (TC) sensor with hydrocarbon compensation	
Measuring range	0 – 100% vol.	
Indication range	-5 – 120% vol.	
Resolution	1% vol.	
Response times	100% vol. H ₂ :	t ₉₀ < 10 s
Warm-up time	< 90 s	
Temperature range	-20 – 40°C (-4 – 104 °F)	
Measuring error	±3% vol.	
Interference, known	- all gases with a different thermal conductivity at 20 °C (68 °F): 10% vol. CO₂ -1 – 0% vol.	
Lifetime, expected	5 years	
Test gases	- zero point: - H₂:	clean air 100% vol.

Methane CH₄, hydrogen H₂ (Inspection above ground, Plants, Structure applications)

Type	thermal conductivity sensor (TC)	
Measuring range	• CH₄: 0 – 2.2% vol. • H₂: 0 – 2.0% vol.	
Indication range	-5 – 10% vol.	
Resolution	0.1% vol.	
Response times	• CH₄: 2.2% vol. t₉₀ < 10 s • H₂: 2.0% vol. t₉₀ < 10 s	
Warm-up time	< 30 s	
Temperature range	-20 – 40°C (-4 – 104 °F)	
Measuring error	• CH₄: ±25% of measured value, minimum 0.3% vol. • H₂: ±20% of measured value, minimum 0.2% vol.	
Interference, known	• all gases with a different thermal conductivity at 20 °C (68 °F), typically: • Gas type CH₄: ○ 1% vol. H₂ < 4.5% vol. ○ 1% vol. C₃H₈ < 0.6% vol. • Gas type H₂: ○ 1% vol. CH₄ < 1.0% vol. ○ 1% vol. C₃H₈ < 1.2% vol.	
Lifetime, expected	5 years	
Test gases	• zero point: clean air • CH₄: ○ 1.0% vol. in synth. air ○ 100% vol. • H₂: 100% vol.	

Methane CH₄, hydrogen H₂ (Inspection above ground, Plants, Structure applications)

Type	gas-sensitive semiconductor (SC)	
Measuring range	0 – 1% vol.	
Indication range	0 – 1.5% vol.	
Resolution	• 0 – 10 ppm • 10 – 100 ppm • 100 – 999 ppm • 0.1 – 0.5% vol. • 0.5 – 1.0% vol.	1 ppm 2 ppm 20 ppm 0.02% vol. (200 ppm) 0 – 1% vol.
Response times	when adding test gas directly at the gas input: • CH₄: 10 ppm: t₉₀ < 7 s 1000 ppm: t₉₀ < 8 s • H₂: 10 ppm: t₉₀ < 5 s 1000 ppm: t₉₀ < 6 s	
Warm-up time	approx. 1 min	
Temperature range	-20 – 40°C (-4 – 104 °F)	
Measuring error	• CH₄: ±30% of measured value • H₂: ±30% of measured value	
Interference, known	• all hydrocarbons • water vapour, CO, CO₂ at 20 °C (68 °F), typically: • gas type CH₄: ○ 100 ppm H₂ < 100 ppm ○ 100 ppm C₃H₈ < 80 ppm ○ Water vapour (< 80% r.h.) < 1 ppm ○ 40 ppm CO < 15 ppm ○ 2% vol. CO₂ < 25 ppm • gas type H₂: ○ 100 ppm CH₄ < 120 ppm ○ 100 ppm C₃H₈ < 100 ppm ○ Water vapour (< 80% r.h.) < 1 ppm ○ 40 ppm CO < 10 ppm ○ 2% vol. CO₂ < 20 ppm	
Lifetime, expected	4 years	
Test gases	use the conditioner for all test gases! • zero point: clean air • CH₄: ○ 10 ppm in synth. air ○ 100 ppm in synth. air ○ 1000 ppm in synth. air ○ 1.0% vol. in synth. air • H₂: ○ 10 ppm in synth. air ○ 100 ppm in synth. air ○ 1000 ppm in synth. air ○ 1.0% vol. in synth. air	

Ethane detector

Type	gas chromatograph
Gases, separable	CH ₄ , C ₂ H ₆ , C ₃ H ₈
Sensor, used	gas-sensitive semiconductor
Measuring range	0 – 12000 ppm
Separating capacity	25 ppm
Resolution	1 ppm
Measurement time	4 min
Warm-up time	approx. 1 min
Measuring error	±30% of measured value
Lifetime, expected	5 years
Test gas	test gas concentration: • zero point: clean air • gas mixture: 1% vol. CH₄ / 100 ppm C₂H₆ in synth. air