VICOTEC320 Air quality tunnel sensors to control ventilation in road tunnels

Reliable air quality measurement in road tunnels

- Energy and cost savings for ventilation control due to very low zero offset and accurate measurement
- Low operational costs because no air aspiration system, no test gases and no ambient air required
- Low maintenance requirements due to long maintenance interval (approx. 1 year)





Reliable air quality measurement in road tunnels

Continuously monitoring air quality and visibility in tunnels is a vital factor in ensuring road safety: It is becoming increasingly important to accurately monitor nitrogen dioxide (NO_2), as even extremely low concentrations (<< 1 ppm) can be harmful. Particles of dust and soot, for example, as well as abrasion from tires and brakes, restrict visibility in tunnels. Plus, the concentration of nitrogen monoxide (NO), produced by diesel-fueled vehicles which are growing in number, needs to be monitored reliably. VICOTEC320 air quality tunnel sensors have long been renowned for accurately monitoring the limit values of NO_2 and NO, and they also use direct, in-situ measurement technology to continuously measure visibility (VIS) in the tunnel atmosphere. These measured values are used to control ventilation in tunnels precisely and reliably. Maintenancefree operation of the VICOTEC320 is possible for more than a year, without compromising on the high level of accuracy and without drifts or cross sensitivities.



$DOAS^1$ spectroscopy for reliable measurement of NO_2 and NO

Gases absorb light with different wavelengths to varying extents. Plotting the intensity of the light beamed through the gas as a function of the wavelength gives a characteristic spectrum for each gas component, which more or less represents the fingerprint of the gas.

In the VICOTEC320, there is an optical grid that spectrally disperses the beam of light reflected by the reflector. A highly sensitive, stabilized line scan camera is used to determine the intensity of each wavelength and record the spectrum. This is then analyzed using the DOAS (Differential Optical Absorption Spectroscopy) principle, which makes it possible to determine the concentration of individual gases.

¹ DOAS = Differential Optical Absorption Spectroscopy

VICOTEC320: For the control of ventilation and for filter monitoring in road tunnels



Product description

The VICOTEC320 measures very small concentrations of NO₂ and NO as well as the visibility and temperature in road tunnels simultaneously and fast using proven components without test gases for zero and reference point. An automatic, cyclic adjustment ensures correct values. The robust enclosure withstands thorough tunnel cleanings without problems. Product requires minimal

At a glance

- Very low detection limits for NO and NO₂
- Automatic function monitoring and self-adjustment

Your benefits

- Energy and cost savings for ventilation control due to very low zero offset and accurate measurement
- Low operational costs because no air aspiration system, no test gases and no ambient air required

Fields of application

Monitoring of air quality in road tunnels

upkeep: maintenance and cleaning once a year. The VICOTEC320 can be optionally equipped with an electrochemical cell for CO measurement. This is useful to perform the plausibility checks which some tunnel standards (e.g. German RABT2006) recommend – even when NO_2 is measured as lead gas component.

- Very sturdy design in stainless steel
- Automatic beam alignment between sender/receiver unit and reflector
- Low maintenance requirements due to long maintenance interval (approx. 1 year)
- Ventilation control and filter monitoring in tunnels



More Information online

For more information, enter the link or scan the QR code to get direct access to technical data, operating instructions, software, application examples, and much more. www.endress.com/vicotec320



Detailed technical data

The exact device specifications and performance data of the product may deviate from the information provided here, and depend on the application in which the product is being used and the relevant customer specifications.

Maximum number of measurands 6 Measurement principles Differential optical absorption spectroscopy (DOAS), transmittance measurement, electrochemical cell, Resistance thermometer Length of measuring path 10 m Measuring ranges 015 km ⁻¹ / 0200 km ⁻¹ Measuring ranges 015 km ⁻¹ / 0200 km ⁻¹ NO0 0100 ppm / 045 ppm Image: Signal	Measured values	Visibility (K-value), NO, NO ₂ , NO _x , CO, temperature
Measurement principlesDifferential optical absorption spectroscopy (DOAS), transmittance measurement, electrochemical cell, Resistance thermometerLength of measuring path10 mMeasuring ranges-Measuring ranges015 km ¹ / 0200 km ⁻¹ Nov0100 ppm / 045 ppmInternet of the spectroscopy (DOAS), transmittance measurementsNov0100 ppm / 0300 ppmInternet of the spectroscopy (DOAS) and spectroscopy (Maximum number of measurands	6
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42 ppm; < 60 ppm	NO ₂	± 0.035 ppm
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Storage temperature-25 °C +75 °CCO sensor0 °C +20 °CAmbient pressure700 hPa 1,200 hPaAmbient humidity10 % 95 %, relative humidity; non-condensing	CO sensor	-10 °C +40 °C
CO sensor0 °C +20 °CAmbient pressure700 hPa 1,200 hPaAmbient humidity10 % 95 %, relative humidity; non-condensing	Storage temperature	−25 °C +75 °C
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Ambient humidity10 % 95 %, relative humidity; non-condensing	Ambient pressure	700 hPa 1,200 hPa
	Ambient humidity	10 % 95 %, relative humidity; non-condensing

Conformition	ASTRA "Guideline - Ventilation of Road Tunnels" (2008)
Comonnues	RABT 2006
	RVS 09.02.22
Electrical safety	CE
Enclosure rating	IP69К
Analog outputs	6 outputs: 0 20 mA, depending on device version
Digital outputs	4 relay contacts: depending on device version
Digital inputs	4 potential-free contacts
Ethernet	
Function	Connection to SOPAS ET software or OPC server
Modbus	
Type of fieldbus integration	ТСР
CAN bus	
Function	For connection of a SCU control unit
Operation	Via software SOPAS ET
Dimensions (W x H x D)	
Sender/receiver unit	718 mm x 470 mm x 310 mm (for details see dimensional drawings)
Reflector unit	617 mm x 278 mm x 245 mm (for details see dimensional drawings)
Connection unit	450 mm x 254 mm x 148 mm (for details see dimensional drawings)
Weight	
Sender/receiver unit	20 kg
Reflector unit	9 kg
Connection unit	8 kg
Material	Stainless steel 1.4571, powder-coated
Power supply	
Voltage	115 V AC, ± 10 % 230 V AC, ± 10 %
Frequency	50 Hz / 60 Hz
Power consumption	≤ 200 W
Options	CO sensor
Test functions	Automatic check cycle for zero and span point Contamination check Manual linearity check

Ordering information

Our regional sales organization will help you to select the optimum device configuration.

Dimensional drawings

VICOTEC320 sender/receiver unit (dimensions in mm (inch))



VICOTEC320 reflector unit (dimensions in mm (inch))







VICOTEC320 connection unit (dimensions in mm (inch))



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