



FLOWSIC200 Flow speed measuring device

Measuring flow velocity and air temperature in tunnels

FLAWSIC200

The measuring titan in the tunnel for long-term operation

FIELDS OF APPLICATION

- Measuring the air velocity and flow direction as well as optionally the temperature for
 - ventilation control in road and railway tunnels or similar structures
 - detection of smoke propagation during tunnel fires for efficient fire fighting

FLAWSIC200 M

- For tunnel diameters up to 22 m (installation angle for 60°)
- Aluminium version with die-cast enclosure for tunnels with low road salt usage or minimal corrosive atmospheres
- Maintenance interval: typically 1 to 2 years
- Ultrasonic transducers made of aluminium

FLAWSIC200 H-M

- For tunnel diameters up to 22 m (installation angle for 60°)
- Stainless steel version
- Ultrasonic transducers from long-lasting titanium – for high durability also in corrosive tunnel atmospheres
- Maintenance interval: typically up to 5 years

FLAWSIC200 H

- High acoustic power for large tunnel diameters up to 35 m (installation angle for 60°)
- Stainless steel version
- Ultrasonic transducers from long-lasting titanium – for high durability also in corrosive tunnel atmospheres
- Maintenance interval: typically up to 5 years

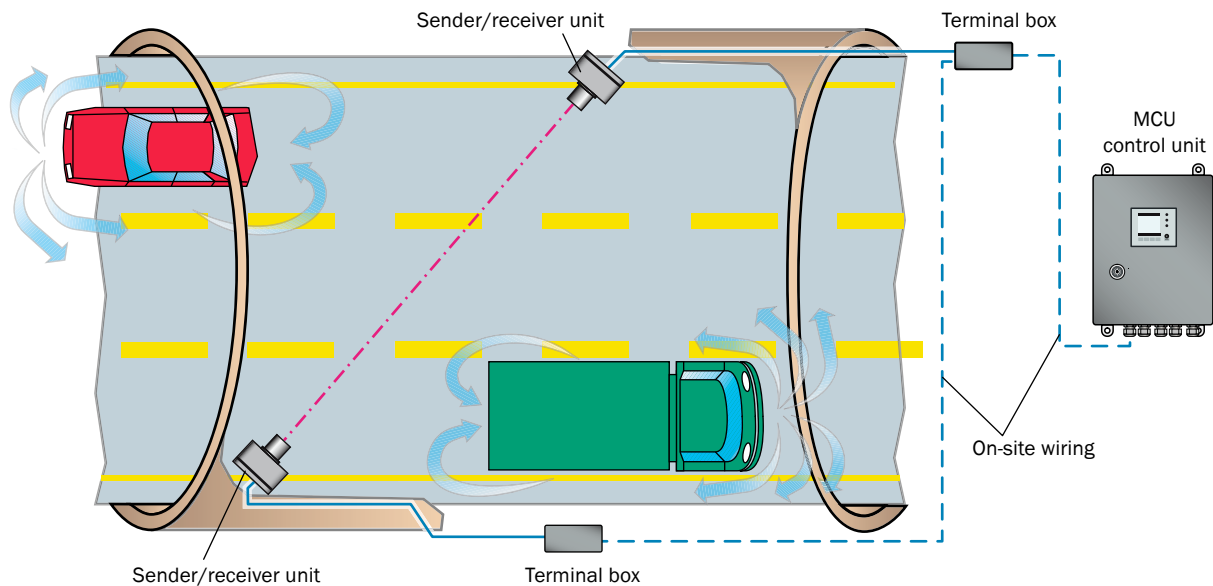
AT A GLANCE

- Non-contact measuring system without any moving parts for lowest operating costs and long maintenance intervals
- Integral measurement over the full tunnel width for representative measuring results – imperative according to tunnel experts, especially when the system is designed for fire hazards
- Precise measurement also for very low flow velocities; therefore perfectly suitable for the assessment of portal emissions





PRODUCT DESCRIPTION

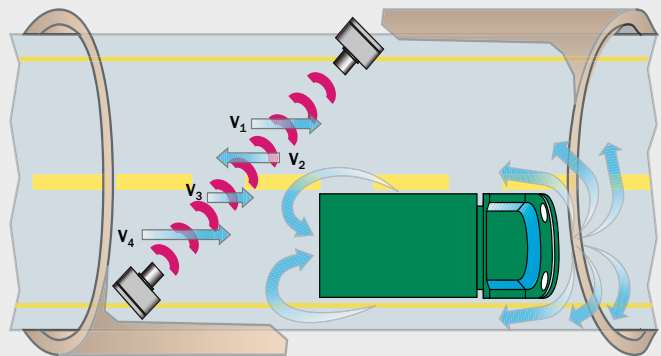


ULTRASONIC MEASUREMENT PRINCIPLE

Two ultrasonic transducers typically installed at an angle of 45° ... 60° to the tunnel axis operate alternately as sender and receiver. The transit time of each sonic pulse depends on air velocity and direction, with the transit time being shorter in forward and longer in reverse direction. Air velocity is calculated from the ultrasonic transit time difference.

Advantages of this method:

- Measured and actual air velocity (averaged over the complete tunnel cross-section) are very much in agreement. Large differences can occur with single-point measurements – even indication of the wrong flow direction.
- Independent of pressure and temperature
- Acoustic temperature measurement possible
- Long operating time because of no moving parts



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Technical Data		FLWSIC200		
Type of models	FLWSIC200 M	FLWSIC200 H-M	FLWSIC200 H	
Measuring Parameters				
Measuring principle	Measurement of difference in ultrasonic transit time			
Measuring components	Air velocity, direction and temperature			
Measuring ranges	-20 m/s ... +20 m/s; continuously variable			
Active measuring path	5 ... 25 m with FLSE200-M and -HM for tunnel width from 3,5 ... 22 m		5 ... 40 m with FLSE200-H; longer on request for tunnel width from 3,5 ... 35 m	
Accuracy	±0.1 m/s (depending on calibration, installation, flow profile, temperature and measuring distance)			
Ambient Conditions				
Ambient temperature	-40 ... +60 °C			
Approvals				
Compliances	<ul style="list-style-type: none"> • RABT 2006 • ASTRA "Guideline - Ventilation of Road Tunnels", 2004, V1.2 • RVS 09.02.22¹⁾ 			
Protection class	<ul style="list-style-type: none"> • IP 66 for FLSE • IP 65 for MCU 			
Electrical safety	CE			
Control Unit Inputs and Outputs				
Analog outputs ²⁾	1 output: 0/2/4 ... 22 mA, max. load 750 Ω			
Analog inputs ²⁾	2 inputs: 0 ... 5/10 V or 0 ... 20 mA			
Digital outputs	5 outputs: 30 V DC/2 A or 48 V/1 A; potential-free Status signals: Operation/malfunction, maintenance, function check, service requirement, limit value			
Digital inputs ²⁾	2 inputs for the connection of potential-free contacts			
Interfaces	<ul style="list-style-type: none"> • USB (service) • RS232 • RS485 with optional interface module • Ethernet with optional interface module 			
Bus protocol	<ul style="list-style-type: none"> • TCP/IP via Ethernet (optional interface module) • PROFIBUS DP via RS485 (optional interface module) • Modbus via RS485 or Ethernet on request 			
General				
System components (for the 3 versions)	<ul style="list-style-type: none"> • 2 sender/receiver units FLSE200 M or FLSE200 H-M or FLSE200 H • 1 MCU control unit (19" rack, option) • 2 terminal boxes • 2 connection cables (FLSE200 - terminal boxes) • 2 mounting brackets 			
Operation	Via the display on the MCU control unit or the SOPAS ET software			
Control function	Internal function check (zero and control point test)			

¹⁾ Only version with stainless steel enclosure

²⁾ Extendible by additional I/O modules