

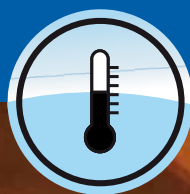
TUNNEL MONITORING BROCHURE

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D-FL 220 T

Ultrasonic Air Flow Monitor



Ultrasonic Air Flow Monitor

Measuring system for continuous evaluation of air flow rate and flow direction in tunnels.

Features & benefits

- Reliable measurement across the tunnel profile
- No separate control unit required
- Easy configuration
- Corrosion resistant
- Sensors can be exchanged very quickly
 - no tools required
 - no re-alignment required"
- Signal transmission by analogue signal/ relay or by RS 485 MODBUS RTU
- Reduced spare requirements
- Immune against ambient noise
- Extremely low maintenance requirements

Description

Two identical sensors alternately emit or receive ultrasonic pulses.

If air flow is present along the measuring path the transition time is slightly different for both directions.

This propagation delay is precisely determined and transformed to the measuring values: air velocity, air flow rate, air flow direction and air temperature.

Two hardware identical sensors are combined, one parametrized as master, the other as slave.

The slave is fully operated and controlled by the master.

The system can be checked and set by access to the master only, either through local USB port or remotely using RS 485 bidirectional MODBUS RTU interface.

This prevents necessity of blocking traffic.

Each sensor allows inspection by help of LED, visible from the outside.

D-FL 220T executes internal self testing routines automatically and requires extremely low maintenance.



D-FL 220T M Sensor

measuring principle	determination of direction dependant differential transition time of ultrasonic pulses
components measured (access via RS 485 modbus RTU)	air velocity, air flow rate, flow direction, temperature
measuring range	-40 to 40 m/s
response time	minimum 1s, can be configured up to 180 s
resolution	0.1 m/s, accuracy dependant upon measuring distance, flow profile, installation, typ. ± 0.2 m/s @ 3 m/s
analog output range	can be configured, typically: -20 to 20 m/s
measuring path	1.2 - 25 m
orientation of measuring path	(0) 30 - 60°C to direction of tunnel axis, typically 45°
signal transmission	1x 4-20mA, 400 Ohm, isolated can be assigned by any measured component and output range
status contacts	1x fault contact, NC, 1x flow direction, NC, rating 48 V, 2 A, variable assignment
transfer of values:	1x RS 485 MODBUS RTU, bi directional to control room etc. 1x intercom RS 485 master-slave
service interface	USB 1.1 port
service tool	software D-ESI 100, requires netbook / laptop and Windows XP™ OS
control cycle	internal automated routines, self test
power supply (sensor)	24 VDC $\pm 10\%$, approx. 1 A
ambient temperature	-25 to 55 °C
protection, weight	IP 67, approx. 2,2 kg
sensor material	stainless steel 1.4571/316Ti, polyamide, ca. RAL5017 flammability rating: B1 (UL 94 V0),
conformity	2004/108 EC (EMV directive), 2006/95 EC (Low voltage directive), EN 61 326-1 (2006), EN 61 010-1 (2001), RABT 2006, ASTRA guide line -ventilation of road tunnels - 2008, V2.01, RVS 09.02.22 2007

D-FL 220T BW Mounting Bracket

material	1.4571/316Ti
fixation at tunnel wall	4x bolt od = 8 mm

D-TB 100T Terminal Box

power supply (terminal box)	90-264 VAC, approx. 30 VA (for master, for slave as an option)
fixation at tunnel wall	4x bolt od = 8 mm
protection	IP 66, 1.5 kg
material	polycarbonate, approx. RAL 7035 flammability rating: B1 (UL 94 V0)
system components	2x D-FL 220T M sensor incl. 1.5m cable with plug 2x D-FL 220T BW 1.4571/316Ti mounting bracket 2x D-TB 100T terminal box w. socket

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