JES t/FL-USX Air Flow Monitoring System

6.1 Technical data t/FL-USX system

Air flow measurement	
Type	JES t/FL-USX
Measuring method	Determination of direction dependant differential transi-tion times of ultrasonic pulses
Measured values	Air speed Air flow rate Direction of air flow Air temperature
Measuring range	-40 .. 40 m/s
Resolution	0.1 m/s, accuracy depending on measuring distance, flow profile, installation, typically <±0.2 m/s at 3 m/s
Response time	> 1s ... 180 s, configurable
Measurement path length	1.2 - 25 m
Alignment	30 - 60° to tunnel longitudinal axis, typically 45°

Outputs	
Analogue output	1 x 4-20 mA, 400 Ω, isolated can be assigned any measured value and output range
Output range	configurable, typically: -20 to 20 m/s
Relay contacts	1 x fault indication (NC) 1 x direction of air flow (NC) (max. 48 V / 0.5 A)
Digital interfaces	1x RS 485 MODBUS RTU to control system, bidirectional 1x Intercom RS 485 master-slave

6.2 Technical data t/FL-USX-TBX terminal boxes

Terminal box A - JES t/FL-USX-TBX-A

Type	t/FL-USX-TBX-A
System cable port	1 (for D-FL 220 T M Sensor A)
Power supply	100 to 240 VAC, 50/60 Hz
Supply voltage fluctuations	± 10 %
Overvoltage category	II
Power rating	60 W
Appliance class	Class I
Material	Stainless steel 1.4404 (AISI 316L)
Mounting	incl. mounting clamp made from Stainless steel 1.4404 for wall mounting
IP rating	IP 69
Dimensions	250 x 160 x 110 mm
Weight	approx. 3.2 kg
Indoor/Outdoor use	Indoor use (tunnel)
Altitude	up to 2,000 m
Temperature range	-40 .. +60 °C
Humidity range	0 .. 100% relative humidity (non-condensing)
Pollution degree	4 (intended environment) / 2 (when cover removed)

Terminal box B - t/FL-USX-TBX-B	
Type	t/FL-USX-TBX-B
System cable port	1 (for D-FL 220 T M Sensor B)
Power supply	24 VDC ±10 %
Current rating	1 A
Appliance class	Class III
Material	Stainless steel 1.4404 (AISI 316L)
Mounting	incl. mounting clamp made from Stainless steel 1.4404 for wall mounting
IP rating	IP 69
Dimensions	160 x 160 x 110 mm
Weight	approx. 1.9 kg
Indoor/Outdoor use	Indoor use (tunnel)
Temperature range	-40 .. +60 °C
Humidity range	0 .. 100% relative humidity (non-condensing)
Pollution degree	4 (intended environment) / 2 (when cover removed)

6.3 Technical data D-FL 220T M measurement sensor

Sensor

Type	DURAG D-FL 220T M
Operating voltage	24 VDC ± 10 %
Current consumption	1 A
Appliance class	Class III
Service interface	USB 1.1
MTBF	> 170.000 h within service life if used within specifications
Material	Sensor housing: Polyamide RAL5017, Flammability rating: B1 (UL 94 V0) Wall bracket: Stainless steel 1.4404 (AISI 316L) or 1.4571 (AISI 316Ti)
IP rating	IP 69
Dimensions	270 x 130 x 95 mm
Weight	Sensor 2.2 kg Wall bracket 1.6 kg
Indoor/Outdoor use	Indoor use (tunnel)
Altitude	up to 2,000 m
Temperature range	-40 .. +70 °C
Humidity range	0 .. 100% relative humidity (non-condensing)
Pollution degree	4 (intended environment)

6.4 Technical data smart/BOX-S-FL-USX gateway (additional)

smart/Architecture gateway for t/FL-USX - smart/BOX-S-FL-USX	
Type	smart/BOX-S-FL-USX
System cable port	1 (for D-FL 220 T M sensor)
Power supply	100 to 240 VAC, 50/60 Hz
Supply voltage fluctuations	± 10 %
Overvoltage category	II
Power rating	60 W
Appliance class	Class I
Digital interfaces	MODBUS RTU (RS-485) MODBUS/TCP (Ethernet) Webserver for configuration (Ethernet)
Material	Stainless steel 1.4404 (AISI 316L)
Mounting	incl. mounting clamp made from Stainless steel 1.4404 for wall mounting
IP rating	IP 69
Dimensions	250 x 160 x 110 mm
Weight	approx. 3.2 kg
Indoor/Outdoor use	Indoor use (tunnel)
Altitude	up to 2,000 m
Temperature range	-40 .. +60 °C
Humidity range	0 .. 100% relative humidity (non-condensing)
Pollution degree	4 (intended environment) / 2 (when cover removed)

7 Standards and regulations

The DURAG GROUP is certified to ISO 9001. The products are manufactured to national, European and international standards.

Conformities	
Markings	
Electrical standards	2014/35/EU Low Voltage Directive (LVD) 2014/30/EU Electromagnetic compatibility (EMC) EN 61010-1 Safety requirements for electrical equipment for measurement, control and laboratory use EN 61326-1 Electrical equipment for measurement, control and laboratory use - EMC requirements
Tunnel safety standards	AT: RVS 09.02.22 DE: RABT 2006 CH: ASTRA RL 13001, Fachhandbuch BSA NO: Norwegian Public Roads Administration Handbook No. 021 Road Tunnels