EX-ATEX Certified
Hall Effect Single Channel Speed Sensor
DSF xx10.xx xHV Ex-atex

valid for sensors with serial no. 1210 and later

Product ID

Type #	Product #	Drawing #
DSF 1210.00 SHV Ex-atex (2m)	374Z-05066	110428F1 Rev.001
DSF 1210.00 SHV Ex-atex (5m)	374Z-05176	110428F1 Rev.001
DSF 1210.00 SHV Ex-atex (10m)	374Z-05590	110428F1 Rev.001
DSF 1410.00 SHV Ex-atex (2m)	374Z-05253	4-111.496F1 Rev.001
DSF 1410.00 SHV Ex-atex (5m)	374Z-05254	4-111.496F1 Rev.001
DSF 1410.00 SHV Ex-atex (10m)	3742607187	4-111.496F1 Rev.001
DSF 1410.02 AHV Ex-atex L=70	374Z-05208	4-113.233B
DSF 1410.02 AHV Ex-atex L=100	374Z-05204	4-113.233
DSF 1410.02 AHV Ex-atex L=140	374Z-05207	4-113.233A
DSF 1610.03 AHV Ex-atex L100	3742609177	121284 Rev.000
DSF 1610.13 AHV Ex-atex L100	3742609291	121450 Rev.000
DSF 1610.14 AHV Ex-atex L176	3742609292	121458 Rev.000
DSF 1610.15 AHV Ex-atex L270	3742609322	121459 Rev.000
DSF 1710.00 AHV S176 Ex-atex	374Z-04816	4-112.295
DSF 1810.00 SHV Ex-atex (2m)	374Z-05067	4-110.687F1 Rev.001
DSF 1810.00 SHV Ex-atex (5m)	374Z-05490	4-110.687F1 Rev.001
DSF 1810.00 S2HV Ex-atex (5m)	374Z-05068	4-112.909
DSF 1810.02 SHV Ex-atex (5m)	374Z-05364	113.727 Rev.000
DSF 2010.00 AHV S30 Ex-atex L=134.5	374Z-05250	3-113.342
DSF 2010.00 AHV S30 Ex-atex L=193.5	374Z-05251	3-113.343
DSF 2210.00 AHV Ex-atex	374Z-05072	4-110.831F1
DSF 2210.00 SHV Ex-atex (2m)	374Z-05069	4-110.777F1
DSF 2210.00 SHV Ex-atex (5m)	374Z-05221	4-110.777F1
DSF 2210.00 S2HV Ex-atex (5m)	374Z-05071	4-112.911
DSF 2210.05 AHV Ex-atex	374Z-05847	115.555 Rev.001
DSF 2210.06 AHV Ex-atex	3742607163	118396 Rev.001
DSF 2210.07 AHV Ex-atex	3742609009	121047 Rev.000
DSF 2210.87 SHV Ex-atex (2m)	374Z-05070	4-111.037F1 Rev.001
DSF 2210.87 SHV Ex-atex (5m)	374Z-05444	4-111.037F1 Rev.001
DSF 2210.87 SHV S85 Ex-atex	374Z-05216	4-113.258
DSF CD10.01 SHV Ex-atex	374Z-05886	115.785 Rev.000
DSF EH10.00 AHV Ex-atex	374Z-05205	4-113.235
DSF EH10.00 SHV Ex-atex (5m)	374Z-05277	4-113.391
DSF EH10.19 SHV Ex-atex	374Z-05887	115.787 Rev.000
DSF EH10.20 SHV Ex-atex	3742606606	117127 Rev.000

General

Function	The speed sensors **DSF xx10.xx xHV Ex-atex** are suitable for use with a pole wheel to generate speed proportional frequency signals. They exhibit dynamic behaviour, whereby pulse generation down to 0.05 Hz is guaranteed. The sensing element is a magnetically biased Hall device, followed by an amplifier having a trigger characteristic and short circuit proof output stage.
Safety Notice	The speed sensors **DSF xx10.xx xHV Ex-atex** are certified for applications in areas with explosive atmospheres. These types are to be duly used in undamaged and clean condition. Modifications of sensors are prohibited if not expressly listed in these operating instructions.
Conformity to Standards	**DSF xx10.xx xHV Ex-atex** series sensors are certified according to EN 50014:1997, EN 50020:1994 and EN 50281-1-1:1998 (see main certificate): • **II 2 G EEx ia IIC T6** for use in flammable gas atmospheres • **II 2 D T147°C IP65** for use in flammable dust atmospheres In addition, the sensors meet the standards EN 60079-0: 2006, EN 60079-11: 2007, EN 61241-0:2006 and EN 61241-11:2006 (see 2. supplement): • **II 2 G Ex ia IIC T6** for use in flammable gas atmospheres • **II 2 D Ex iaD 21 T147°C IP65** for use in flammable dust atmospheres They have been designed, manufactured and tested according to the state of the art. For their application the restrictions listed in the European Certificate of Conformity ZELM 03 ATEX 0124X, its 1. Supplement and 2. Supplement must be observed. Sensors with in built connectors (DSF xx10.yy AHV Ex-atex) qualify only for flammable gas atmospheres and not for dust.

Technical data

Supply voltage	8 ... 28 VDC, max. superimposed AC ripple of 25mVpp. The voltage drop as a result of the cable impedance and safety barriers resistance must be allowed for. Protected against reverse polarity.
Current consumption	Max. 15 mA (without load)
Signal output	• Square wave from push-pull output stage • DC coupled to the supply (0V = reference voltage) • Load current max. 25 mA • Output voltage: $U_{Hi} > U_{Supply}$ - 4 V (at I_{source} = 25 mA) U_{Lo} < 2 V (at I_{sink} = 25 mA) • The voltage drop as a result of the cable impedance and resistance of safety barriers must be allowed for. • Short circuit proof and protected against reverse polarity.
Frequency range	0.05 Hz...20 kHz
Electromagnetic compatibility (EMC)	According to 2004/108/EC, IEC 61000-6-2, IEC 61000-6-2
Housing	Stainless steel X12CrNiS188 (material number 1.4305), front side hermetically sealed, electronic components potted in a chemical and age proof ceramic. Maximum permissible tightening torque: **12 Nm** for M12x1 **25 Nm** for M14x1 **35 Nm** for M16x1 **40 Nm** for M18x1.5 **50 Nm** for M18x1 **75 Nm** for M22x1 Dimensions according to drawing.
Pole wheel	Toothed wheel made of a magnetically permeable material (e.g. Steel 1.0036) • Minimum tooth width 10 mm • Side offset < 0.2 mm • Eccentricity < 0.2mm • Involute gear wheel preferred (module ≥0.5)

Air gap sensor / pole wheel	Air gap between pole wheel (involute gear) and sensor housing: • Module 1 mm: 0.2...1.0 mm • Module 2 mm: 0.2...2.5 mm • Module 4 mm (and larger): 0.2...4.5 mm
Insulation	Housing, cable screen (if applicable) and electronics galvanically separated (500 V/50 Hz/ 1 min)
Protection class	IP68 (head), IP67 (cable connection), IP 54 (where connector used)
Vibration immunity	5 g_n in the range 5...2000Hz
Shock immunity	20 g during 20 ms, half-sine wave
Temperature*	The temperature and atmosphere limitations for each sensor housing size, as shown in TABLE 1, must be observed and the restrictions given in the EC Type Examination Certificate must be adhered to. The minimum allowable temperature (according to the certificate) is listed in TABLE 2 and TABLE 3.
EX-Safety and Marking	**For these explosion protected sensors a copy of the European Certificate of Conformity ZELM 03 ATEX 0124X, its 1st, 2nd and 3rd supplement are attached.** **See also below, the Ex related information in this documentation.** As mentioned in the section "Conformity to Standards", these sensors fulfil both the "old" standards (EN 50014:1997, EN 50020:1994 and EN 50281-1-1:1998) and the "current" standards (EN 60079-0: 2006, EN 60079-11: 2007, EN 61241-0:2006 and EN 61241-11:2006). Marking of the sensors (according to the old or the current standard) depends on the fabrication date of the sensors.
Connection	The sensors must be connected according to the sensor drawing. Sensor wires are susceptible to radiated noise. Hence, the sensor wires must be laid as far as possible from large electrical machines. They must not run parallel in the vicinity of power cables. The permissible cable length is limited from a safety point of view according to the 1. Supplement of the Certificate of Conformity ZELM 03 ATEX 0124X.
Installation	For installation, the CE directives for the installation of apparatus in explosive environments must be taken into account. The housing has to be aligned to the pole wheel according to the sensor drawing: Deviations in positioning may affect the functioning and decrease the noise immunity of the sensor. The sensor should be mounted with the middle of the face side over the middle of the pole wheel. Where the pole wheel has teeth or slots and with radial sensor location, the sensor would normally be mounted over the centre. Dependent upon the wheel width, a certain degree of axial movement is permissible. However, the middle of the sensor must be at minimum in a distance of 3mm from the edge of the pole wheel under all operating conditions. **A solid and vibration free mounting of the sensor is important.** Eventual sensor vibration relative to the pole wheel can induce additional output pulses. The sensors are insensitive to oil, grease etc and can be installed in arduous conditions. During installation, the smallest possible pole wheel to sensor gap should be set. The gap should however be set to prevent the face of the sensor ever touching the pole wheel. Within the air gap specified the amplitude of the output signals is not influenced by the air gap.
Maintenance	No maintenance required. The sensors cannot be repaired.

*The maximum permissible operating temperature depends upon the following parameters, as shown in TABLE 1:

- Sensor housing size
- Maximum available electrical power from the intrinsically safe sensor power supply and from the intrinsically safe input circuit of the attached instrumentation and any Zener barriers.
- Ex Temperature class (T1-T6)

Operating temperature for ***II 2 D Ex iaD 21 T147°C IP65:*** -20 ... +100°C / -65 ... +100°C (see supplement 3)
Where dust clouds are present, the surface temperature of the sensor must not exceed 2/3 of the ignition temperature of the corresponding dust / air mixture.

In the event of dust coatings being present, the surface temperature of the sensor must not exceed the limits defined in the corresponding standards.

Operating temperature for ***II 2 G Ex ia IIC T6*** *per table:*

Sensor Type or Housing size	maximum available electrical power [mW]	maximum permissible operating Temperature [°C] Ex hazardous areas: Temperature class						Examples for safety Zener barriers from STAHL (PTB 01 ATEX 2088)
		T1	T2	T3	T4	T5	T6	Power supply & Signal path
DSF 1210… to DSF 1610… and DSF AB10… DSF EH10…	900	125	125	125	83	48	33	1 x 9001/01-280-075-101 & 1 x 9001/01-280-050-101
	630	125	125	125	96	61	46	2 x 9001/01-168-075-101
	525	125	125	125	102	67	52	1 x 9001/01-168-075-101 & 1 x 9001/01-168-050-101
	490	125	125	125	104	69	54	1 x 9001/01-280-050-101 & 1 x 9001/01-280-020-101
	399	125	125	125	108	73	58	1 x 9001/01-168-075-101 & 1 x 9001/01-168-020-101
	300	125	125	125	113	78	63	-
	200	125	125	125	117	82	67	-
	100	125	125	125	120	89	74	-
	50	125	125	125	120	91	76	-
DSF 1710… to DSF 2010… and DSF CD10…	900	125	125	125	90	55	40	1 x 9001/01-280-075-101 & 1 x 9001/01-280-050-101
	630	125	125	125	102	67	52	2 x 9001/01-168-075-101
	525	125	125	125	106	71	56	1 x 9001/01-168-075-101 & 1 x 9001/01-168-050-101
	490	125	125	125	107	72	57	1 x 9001/01-280-050-101 & 1 x 9001/01-280-020-101
	399	125	125	125	111	76	61	1 x 9001/01-168-075-101 & 1 x 9001/01-168-020-101
	300	125	125	125	115	80	65	-
	200	125	125	125	120	85	70	-
	100	125	125	125	120	89	74	-
	50	125	125	125	120	91	76	-
DSF 2110… to DSF 3210...	900	125	125	125	98	63	48	1 x 9001/01-280-075-101 & 1 x 9001/01-280-050-101
	630	125	125	125	107	72	57	2 x 9001/01-168-075-101
	525	125	125	125	110	75	60	1 x 9001/01-168-075-101 & 1 x 9001/01-168-050-101
	490	125	125	125	111	76	61	1 x 9001/01-280-050-101 & 1 x 9001/01-280-020-101
	399	125	125	125	114	79	64	1 x 9001/01-168-075-101 & 1 x 9001/01-168-020-101
	300	125	125	125	118	83	68	-
	200	125	125	125	120	86	71	-
	100	125	125	125	120	90	75	-
	50	125	125	125	120	91	76	-

TABLE 1: Operating temperature for use in explosive gas environment

Type-list:

Type	Art.-Nr.	Housing Thread	Connection Connector	Mating connector supplied **(1)**	Cable length **(2)**	Ambient temperature range: according to TABLE 3
DSF 1210.00 SHV Ex-atex (2m)	374Z-05066	M12x1	-	-	2m	type 1
DSF 1210.00 SHV Ex-atex (5m)	374Z-05176	M12x1	-	-	5m	type 1
DSF 1210.00 SHV Ex-atex (10m)	374Z-05590	M12x1	-	-	10m	type 1
DSF 1410.00 SHV Ex-atex (2m)	374Z-05253	M14x1	-	-	2m	type 1
DSF 1410.00 SHV Ex-atex (5m)	374Z-05254	M14x1	-	-	5m	type 1
DSF 1410.00 SHV Ex-atex (10m)	3742607187	M14x1	-	-	10m	type 1
DSF 1410.02 AHV Ex-atex L=70	374Z-05208	M14x1	MS3102A-10SL-3P	yes	-	type 3
DSF 1410.02 AHV Ex-atex L=100	374Z-05204	M14x1	MS3102A-10SL-3P	yes	-	type 3
DSF 1410.02 AHV Ex-atex L=140	374Z-05207	M14x1	MS3102A-10SL-3P	yes	-	type 3
DSF 1610.03 AHV Ex-atex	3742609177	M16x1.5	MS3102A-10SL-3P	yes	-	type 3
DSF 1610.13 AHV Ex-atex L100	3742609291	M16x1.5	MS3102A-10SL-3P	yes	-	type 3
DSF 1610.14 AHV Ex-atex L176	3742609292	M16x1.5	MS3102A-10SL-3P	yes	-	type 3
DSF 1610.15 AHV Ex-atex L270	3742609322	M16x1.5	MS3102A-10SL-3P	yes	-	type 3
DSF 1710.00 AHV S176 Ex-atex	374Z-04816	M17x1	MS3102A-10SL-3P	yes	-	type 3
DSF 1810.00 SHV Ex-atex (2m)	374Z-05067	M18x1	-	-	2m	type 1
DSF 1810.00 SHV Ex-atex (5m)	374Z-05490	M18x1	-	-	5m	type 1
DSF 1810.00 S2HV Ex-atex (5m)	374Z-05068	M18x1	-	-	5m	type 1
DSF 1810.02 SHV Ex-atex (5m)	374Z-05364	M18x1.5	-	-	5m	type 1
DSF 2010.00 AHV S30 Ex-atex L=134.5	374Z-05250	M20x2.5	MS3102A-10SL-3P	yes	-	type 3
DSF 2010.00 AHV S30 Ex-atex L=193.5	374Z-05251	M20x2.5	MS3102A-10SL-3P	yes	-	type 3
DSF 2210.00 AHV Ex-atex	374Z-05072	M22x1	ERA 2S-304 CLL	yes	-	type 3
DSF 2210.00 SHV Ex-atex (2m)	374Z-05069	M22x1	-	-	2m	type 1
DSF 2210.00 SHV Ex-atex (5m)	374Z-05221	M22x1	-	-	5m	type 1
DSF 2210.00 S2HV Ex-atex (5m)	374Z-05071	M22x1	-	-	5m	type 1
DSF 2210.05 AHV Ex-atex	374Z-05847	M22x1	MS3102A-10SL-3P	no	-	type 3
DSF 2210.06 AHV Ex-atex	3742607163	M22x1	MS3102A-10SL-3P	yes	-	type 3
DSF 2210.07 AHV Ex-atex	3742609009	M22x1	MS3102A-10SL-3P	yes	-	type 3
DSF 2210.87 SHV Ex-atex (2m)	374Z-05070	M22x1	-	-	2m	type 1
DSF 2210.87 SHV Ex-atex (5m)	374Z-05444	M22x1	-	-	2m	type 1
DSF 2210.87 SHV S85 Ex-atex	374Z-05216	M22x1	-	-	5m	type 1
DSF CD10.01 SHV Ex-atex	374Z-05886	3/4"-20UNEF-2A	-	-	2m	type 1
DSF EH10.00 AHV Ex-atex	374Z-05205	5/8"-18UNF-2A	ERA 2S-304 CLL	yes	-	type 3
DSF EH10.00 SHV Ex-atex (5m)	374Z-05277	5/8"-18UNF-2A	-	-	5m	type 1
DSF EH10.19 SHV Ex-atex	374Z-05887	5/8"-18UNF-2A	-	-	2m	type 1
DSF EH10.20 SHV Ex-atex	3742606606	5/8"-18UNF-2A	-	-	5m	type 1

TABLE 2: sensor type description

(1) Mating connector for cable diameter 3.1...4.1mm, other diameters on request

(2) The limitations relating to permissible cable capacitance and inductance detailed in the EC Type Examination Certificate and its 1st supplement under Ex power supply and instrumentation Ex input must be adhered to!

Ambient temperature range	Connection type	Supplements valid	Ambient temperature (gas) (3)	Ambient temperature (dust)	Marking
type 1	S/S2 cable	1 & 2	-20℃ ... => TABLE 1	-20 ... +100 ℃	Ex II 2G Ex ia IIC T6 and II 2D Ex iaD 21 T147℃ IP65
type 2	S/S2 cable	1 & 2 & 3	-65℃ ... => TABLE 1	-65 ... + 100℃	Ex II 2G Ex ia IIC T6 and II 2D Ex iaD 21 T200℃ IP65
type 3	A connector	1 & 2 & 3	-65℃ ... => TABLE 1	Not allo wed	Ex II 2G Ex ia IIC T6

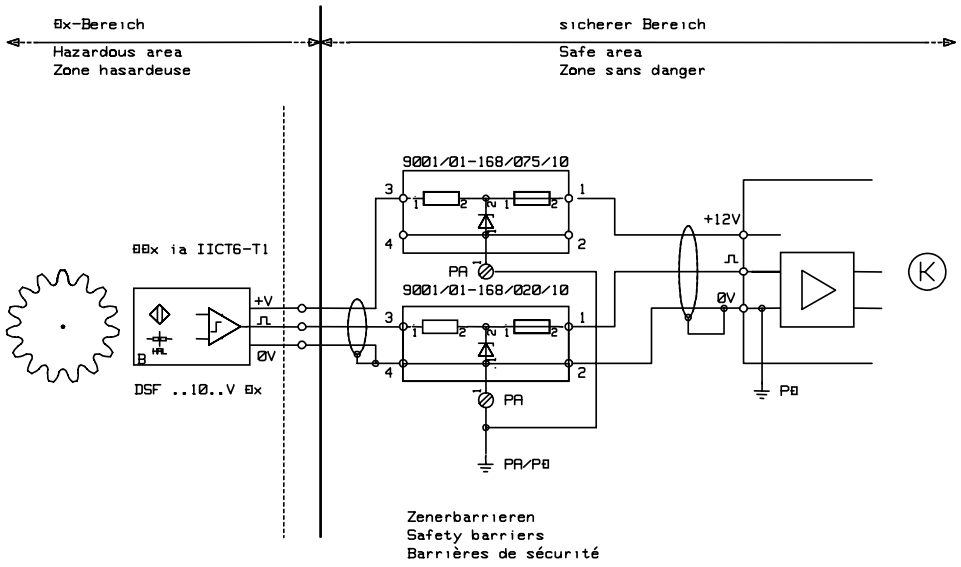
TABLE 3: description of the maximum allowed ambient temperature dependent on the Ex-category (G / D) and the connection type

(3) The temperature and atmosphere limitations for each sensor housing size, as shown in the table, must be observed and the restrictions given in the EC Type Examination Certificate must be adhered to.

Connection method:

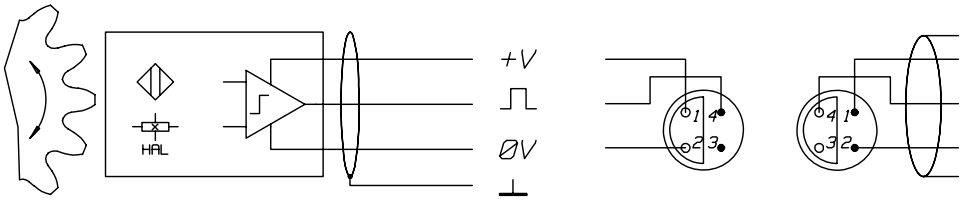
Version AH	Connector per TABLE 2.
Version SH	**Teflon cable**, Art.-Nr. 824L-35053, 4-pole, 4 x 0.24 mm² (AWG 24), screened wires (mesh screen, isolated from housing), white outer shell Ø max. 4.0 mm, bending radius min. 60 mm, weight 32 g/m. **The brown wire is not used.**
Version S2H	**Silicone cable,** Art-Nr. 824L-36622, 6-pole, 6 x 0.6 mm² (AWG 20), screened wires (mesh screen, isolated from housing), black outer shell Ø max. 13.0 mm, bending radius min. 30 mm, weight 200 g/m. **The brown, blue and orange wires are not used.**

Connection using Zener barriers (example):

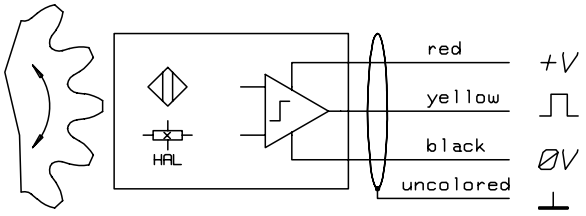


Connection diagrams (refer to dimensional drawing for exact type):

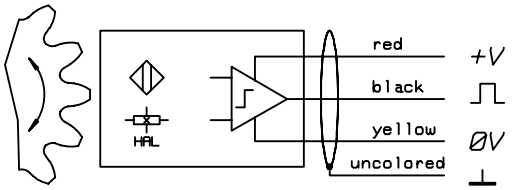
- ***Sensor types DSF xx10.00 AHV Ex-atex:***



- ***Sensor types DSF xx10.0x SHV Ex-atex und DSF xx10.0x S2HV Ex-atex (for reference only, colors of wires may be different, check dimensional drawings):***



- ***Sensor type DSF 2210.87 SHV Ex-atex (for reference only, colors of wires may be different, check dimensional drawings):***



Baugruppen-Einbauerklärung nach Anhang II.B (Artikel 4 Absatz 2 der Richtlinie 98/37/EG) und Konformitätserklärung

Declaration of incorporation of a subassembly (Annex II.B; Article 4(2) of Directive 98/37/EC) and declaration of conformity

Der Hersteller / *The manufacturer*

Jaquet AG, Thannerstrasse 15, CH-4009 Basel

erklärt, dass die nachfolgende Baugruppe / *hereby declares that the subassembly described below*

Bezeichnung / *Description:*

Hallsensor DSF xx10.xx xHV Ex atex

Kennzeichnung / *Marking:* Ⓔx II 2G Ex ia IIC T6 und/*and* oder/*or* Ⓔx II 2D Ex iaD 21 T 147°C IP65

Identifikations-Nummer lt. Lieferpapieren / *Identification number check shipping documents*

erst in Betrieb genommen werden darf, nachdem die Konformität der Anlage, in die diese eingebaut wird, mit den Bestimmungen der Richtlinie 98/37/EG und den sie umsetzenden nationalen Rechtsvorschriften erklärt wurde,
mit den Bestimmungen folgender harmonisierter Normen, in der zum Unterschriftsdatum gültigen Fassung übereinstimmt:
EN 60079-0 Elektrische Betriebsmittel für gasexplosionsgefährdete Bereiche; Allgemeine Bestimmungen
EN 60079-11 Explosionsfähige Atmosphäre – Teil 11: Geräteschutz durch Eigensicherheit "i"
EN 61241-0 Elektrische Betriebsmittel zur Verwendung in Bereichen mit brennbarem Staub – Teil 0: Allgemeine Anforderungen
EN 61241-11 Elektrische Betriebsmittel zur Verwendung in Bereichen mit brennbarem Staub – Teil 11: Schutz durch Eigensicherheit "iD"
EN 61010-1 Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte, Teil 1: Allgemeine Anforderungen
EN 61000-6-2 Elektromagnetische Verträglichkeit (EMV), Teil 6-2: Fachgrundnormen, Störfestigkeit für Industriebereich
EN 61000-6-4 Elektromagnetische Verträglichkeit (EMV), Teil 6-4: Fachgrundnormen, Störaussendung für Industriebereich
EN 61000-4-2/3/4/5/6/8/11 Elektromagnetische Verträglichkeit (EMV): Prüf- und Messverfahren
EN 50011 Industrielle Niederspannungs-Schaltgeräte. Anschlussbezeichnungen, Kennzahlen und Kennbuchstaben für bestimmte Hilfsschütze

may not be put into service before the system into which it will be incorporated has been declared to be compliant with the provisions of Directive 98/37/EC, and with the regulations transposing it into national law;
complies with the provisions of the following harmonized standards in the version valid at signature date:
EN 60079-0 Electrical apparatus for explosive gas atmospheres: General requirements
EN 60079-11 Explosive Atmospheres: Equipment protection by intrinsic safety "i"
EN 61241-0 Electrical apparatus for use in the presence of combustible dust – Part 0: General requirements
EN 61241-11 Electrical apparatus for use in the presence of combustible dust – Part 11: Protection by intrinsic safety "iD"
EN 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1: General requirements
EN 61000-6-2 Electromagnetic compatibility (EMC; Part 6-2: Generic standards, Immunity for industrial environments
EN 61000-6-4 Electromagnetic compatibility (EMC); Part 6-4: Generic standards, Emission standard for industrial environments
EN 61000-4-2/3/4/5/6/8/11 Electromagnetic compatibility (EMC): Testing and measurement techniques
EN 50011 Specification for low voltage switchgear and controlgear for industrial use. Terminal marking, distinctive number and distinctive letter for particular contactor relays

Mit den Bestimmungen folgender Europäischer Richtlinien übereinstimmt:

RL 94/9/EG	Explosionsschutz
RL 2004/108/EG	EMV

Complies with the provisions of the following European Directives:

Directive 94/9/EC	*Explosion protection*
Directive 2004/108/EC	*EMC*

Ausgefertigt in Basel am 09. Februar 2009

Andreas Kister, Head of Engineering

Signed in Basel on February, 9th, 2009

Wolfgang Schnell, EX-delegate

Prüf- und Zertifizierungsstelle

ZELM Ex

(1) EC-TYPE-EXAMINATION CERTIFICATE

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-TYPE-EXAMINATION CERTIFICATE Number:

ZELM 03 ATEX 0124X

(4) Equipment: **Rotation speed sensor type DSF ..10.**.HV Ex**

(5) Manufacturer: **JAQUET AG**

(6) Address: **Thannerstrasse 15, CH-4009 Basel**

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Prüf- und Zertifizierungsstelle ZELM Ex, notified body No. 0820 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report ZELM Ex 0370215173.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50 014: 1997+A1+A2 **EN 50020: 1994** **EN 50 281-1-1: 1998**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this Certificate.

(12) The marking of the equipment shall include the following:

Ex **II 2 G EEx ia IIC T6 and II 2 D T 147°C IP 65**

Zertifizierungsstelle **ZELM Ex**

Zertifizierungsstelle und Prüfstelle ZELM Ex

Braunschweig, June 18, 2003

Adolf Gruber

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This English version is based on the German text. In the case of dispute, the German text shall prevail.

Prüf- und Zertifizierungsstelle

ZELM Ex

(13) **SCHEDULE**

(14) **EC-TYPE-EXAMINATION CERTIFICATE ZELM 03 ATEX 0124X**

(15) Description of equipment

The rotation speed sensors are used for the recording of the rotation speed for the touchless scanning of rotating ferromagnetic rotating magnetic poles, gears, camshafts and the like.

Model key:

Rotation speed sensor type DSF ..10.** .HV Ex

- Version with firmly connected line
  - S = teflon cable or
  - S2 = silicone cable or
  - A = version with plug adapter (only category 2 G)
- version differences irrelevant for security reasons
- Thread size:
  - 12 = M12
  - 18 = M18
  - 22 = M22
  - EH = 5/8" –18 UNF

Electrical data

Supply- and signal circuit: type of protection Intrinsic Safety EEx ia IIC resp. IIB or iaD for use according to category 2D

only for the connection to certified intrinsically safe circuits

maximum values: U_i = 28 V
I_i = 150 mA
P_i = 900 mW (at category 2D) and/or
$P_i \leq$ 900 mW (in accordance with table 1 at category 2 G)

Maximum effective inner capacity C_i = 36 nF

The maximum effective inner inductance is negligibly small

For use according to category 2D the maximum permissible ambient temperature conducts to 100°C.

The lower temperature boundary is for all versions and applications - 20 °C.

The temperature class, the maximum permissible ambient temperature and the maximum permissible power of the connected, certified, intrinsically safe circuit (P_i) for the different versions are for the usage according to category 2G are to be determined with the following table.

Prüf- und Zertifizierungsstelle

ZELM Ex

Schedule to EC-TYPE-EXAMINATION CERTIFICATE ZELM 03 ATEX 0124X

Table 1

type	P_i [mW]	maximum ambient temperature for the temperature classes T1	T2	T3	T4	T5	T6
DSF 1210...	900	125	125	125	83	48	33
DSF 1410...	630	125	125	125	96	61	46
DSF 1610...	525	125	125	125	102	67	52
DSF EH10..	490	125	125	125	104	69	54
	399	125	125	125	108	73	56
	300	125	125	125	113	78	63
	200	125	125	125	117	82	67
	100	125	125	125	120	89	74
	50	125	125	125	120	91	76
DSF 1810...	900	125	125	125	90	55	40
DSF 2010...	630	125	125	125	102	67	52
	525	125	125	125	106	71	56
	490	125	125	125	107	72	57
	399	125	125	125	111	76	61
	300	125	125	125	115	80	65
	200	125	125	125	120	85	70
	100	125	125	125	120	89	74
	50	125	125	125	120	91	76
DSF 2210...	900	125	125	125	98	63	48
	630	125	125	125	107	72	57
	525	125	125	125	110	75	60
	490	125	125	125	111	76	61
	399	125	125	125	114	79	64
	300	125	125	125	118	83	68
	200	125	125	125	120	86	71
	100	125	125	125	120	90	75
	50	125	125	125	120	91	76

(16) Report No.

ZELM Ex 0370215173

(17) Special conditions for safe use

1. The Rotation Speed Sensors may be used only in intrinsically safe circuits in accordance with the information in this EC-Type-Examination Certificate.
2. The permissible ambient temperature range is to be determined according to the determination of this EC-Type-Examination Certificate.
3. The versions with plug adapter are only intended for use in areas, in which explosive atmospheres caused by gases or vapours in accordance with the category 2 G might occur.
4. The instruction manual has to be considered.

Prüf- und Zertifizierungsstelle

ZELM Ex

Schedule to EC-TYPE-EXAMINATION CERTIFICATE ZELM 03 ATEX 0124X

(18) Essential Health and Safety Requirements

met by standards

Zertifizierungsstelle **ZELM Ex**

Braunschweig, June 18, 2003

Adolf Gruber

Zertifizierungs- und Prüf- stelle ZELM Ex

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Prüf- und Zertifizierungsstelle

ZELM Ex

1. Supplement

(Supplement according to EC-Directive 94/9 Annex III letter 6)

to EC-type-examination Certificate

ZELM 03 ATEX 0124 X

Equipment:	**Rotation speed sensor type DSF ..10.**.HV Ex**
Manufacturer:	**JAQUET AG**
Address:	**Thannerstrasse 15, CH-4009 Basel**

Description of supplement

The 1. Supplement considers application different length of the connecting cables for different types of sensors.
Additional to the maximum values of the effective inner capacitance and inductance mentioned in the EC-Type Examination Certificate following maximal values of the capacitance and inductance are to be considered by using connecting cables with the length of more than 5 m:

C_i = 240 pF/m
L_i = 1,5 µH/m

The explosion protection of the equipment is not affected by these changes.
The equipment may be used in future also in consideration of this Supplement.
The type of protection, all further data as well as the special conditions remain unchanged and also apply to this 1. Supplement.

References:

The instruction manual has to be observed.

Report No.

ZELM Ex 1120617487

Essential Health and Safety Requirements

The Essential Health and Safety Requirements are still fulfilled under consideration of the Standards mentioned in the EC-type-examination Certificate.

Zertifizierungsstelle **ZELM** Ex

Dipl.-Ing. Harald Zelm

Zertifizierungsstelle ZELM Ex

Braunschweig, September 27, 2006

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Prüf- und Zertifizierungsstelle ZELM Ex • Siekgraben 56 • D-38124 Braunschweig

2. Supplement

(Supplement according to EC-Directive 94/9 Annex III letter 6)

ZELM ex

to EC-type-examination Certificate

ZELM 03 ATEX 0124 X

Equipment:	**Rotation speed sensor type DSF ..10.**.HV Ex**
Manufacturer:	**JAQUET AG**
Address:	**Thannerstrasse 15, CH-4009 Basel**

Description of supplement

The 2. Supplement concerns extension of the Rotation speed sensors by additional variations with alternative threads and length.
Further, the agreement of the Rotation speed sensors with the current standards has been checked.
The marking of the Rotation speed sensors is in future:

⟨Ex⟩ **II 2 G Ex ia IIC T6 und II 2 D Ex iaD 21 T 147°C IP 65**

The model key will be extended and reads as follows in future:

Model key:

Rotation speed sensor type DSF ..10.** .HV Ex

- Version with firmly connected line
  - S = teflon cable or
  - S2 = silicone cable or
  - A = version with plug adapter (only category 2 G)
- version differences irrelevant for safety reasons
- Thread size:
  - 12 = M12 to 32 = M32 respectively
  - AB = ½"
  - CS = ¾"
  - EH = 5/8" –18 UNF

2. Supplement to EC-Type-Examination Certificate ZELM 03 ATEX 0124 X

ZELM ex

Electrical data

Supply- and signal circuit

type of protection Intrinsic Safety Ex ia IIC resp. IIB or iaD for use according to category 2D

only for the connection to certified intrinsically safe circuits

maximum values: U_i = 28 V
I_i = 150 mA
P_i = 900 mW (at category 2D) resp.
$P_i \leq$ 900 mW (in accordance with table 1 at category 2 G)

Maximum effective inner capacity C_i = 36 nF
The maximum effective inner inductance is negligibly small
Additional to the maximum values of the effective inner capacitance and inductance following maximal values of the capacitance and inductance are to be considered by using connecting cables with the length of more than 5 m:

C_i = 240 pF/m
L_i = 1,5 µH/m

For use according to category 2D the maximum permissible ambient temperature conducts to 100°C. The lower temperature boundary is for all versions and applications - 20 °C.

The temperature class, the maximum permissible ambient temperature and the maximum permissible power of the connected, certified, intrinsically safe circuit (P_i) for the different versions are for the usage according to category 2G are to be determined with the following table.

Table 1

Type	P_i [mW]	Maximum ambient temperature for the temperature classes T1	T2	T3	T4	T5	T6	Temp.-categorie
DSF 1210... to DSF 1610... and DSF AB10.. DSF EH10..	900	125	125	125	83	48	33	A
	630	125	125	125	96	61	46	
	525	125	125	125	102	67	52	
	490	125	125	125	104	69	54	
	399	125	125	125	108	73	56	
	300	125	125	125	113	78	63	
	200	125	125	125	117	82	67	
	100	125	125	125	120	89	74	
	50	125	125	125	120	91	76	
DSF 1710... to DSF 2010... and DSF CD10..	900	125	125	125	90	55	40	B
	630	125	125	125	102	67	52	
	525	125	125	125	106	71	56	
	490	125	125	125	107	72	57	
	399	125	125	125	111	76	61	
	300	125	125	125	115	80	65	
	200	125	125	125	120	85	70	
	100	125	125	125	120	89	74	
	50	125	125	125	120	91	76	
DSF 2110... to DSF 3210...	900	125	125	125	98	63	48	C
	630	125	125	125	107	72	57	
	525	125	125	125	110	75	60	
	490	125	125	125	111	76	61	
	399	125	125	125	114	79	64	
	300	125	125	125	118	83	68	
	200	125	125	125	120	86	71	
	100	125	125	125	120	90	75	
	50	125	125	125	120	91	76	

2. Supplement to EC-Type-Examination Certificate ZELM 03 ATEX 0124 X

ZELM ex

All further technical data and the special conditions for safe use mentioned in the EC-Type Examination Certificate remain unchanged and are also valid for this 2. Supplement.

The Rotation speed sensors may be manufactured in future also under consideration of these changes.

Report No.

ZELM Ex 0280926677

Essential Health and Safety Requirements

Within the scope of this 2. Supplement the agreement of the device with the current standards has been checked.

The essential health and safety requirements are still fulfilled by compliance with the following Standards:

EN 60079-0:2006	EN 60079-11:2007
EN 61241-0:2006	EN 61241-11:2006

Braunschweig, March 09, 2008

ZELM ex

Zertifizierungs-stelle

Zertifizierungsstelle ZELM ex
Dipl.-Ing. Harald Zelm

ZELM ex

3. Supplement

(Supplement according to EC-Directive 94/9 Annex III letter 6)

ZELM ex

to EC-type-examination Certificate

ZELM 03 ATEX 0124 X

Equipment: **Rotation speed sensor type DSF ..10.**.HV Ex**

Manufacturer: **JAQUET AG**

Address: **Thannerstrasse 15, CH-4009 Basel**

Description of supplement

The 3. Supplement concerns the alternative type with a modified marking of the Rotation speed sensors, this supplement is characterized by the changing of the permissible temperature range and the decrease of input power in dust explosive atmosphere.

The marking of the Rotation speed sensors is alternative in future:

II 2 G Ex ia IIC T6 and II 2 D Ex iaD 21 T 200°C IP 65

The electrical data for this alternative type is as follows:

Electrical data

Supply- and signal circuit

type of protection Intrinsic Safety Ex ia IIC resp. IIB or iaD for use according to category 2D

only for the connection to certified intrinsically safe circuits

maximum values: U_i = 28 V
I_i = 150 mA
P_i = 550 mW (at category 2D) resp.
$P_i \leq$ 900 mW (at category 2 G)

Maximum effective inner capacity C_i = 36 nF
The maximum effective inner inductance is negligibly small
Additional to the maximum values of the effective inner capacitance and inductance following maximal values of the capacitance and inductance are to be considered by using connecting cables with the length of more than 5 m:

C_i = 240 pF/m
L_i = 1,5 µH/m

For use according to category 2D the maximum permissible ambient temperature is 100°C, the lower temperature margin is –65°C for this alternative type.

The temperature class, the maximum permissible ambient temperature and the maximum permissible power of the connected, certified, intrinsically safe circuit (P_i) for the different versions for the usage according to category 2G aren't to be changed and furthermore valid, only the lower temperature margin is –65°C for the alternative type.

3. Supplement to EC-Type-Examination Certificate ZELM 03 ATEX 0124 X

ZELM ex

The special conditions for safe use of this alternative type are as follows.

Special conditions for safe use

1. The Rotation Speed Sensors may be used only in intrinsically safe circuits in accordance with the information in this EC-Type-Examination Certificate.
2. The permissible ambient temperature range is to be determined according to the determination of this Supplement to EC-Type-Examination Certificate.
3. The instruction manual has to be considered.
4. For uses with a lower temperature margin between –20°C and –65°C, the rotation speed sensor and the cable has to be installed avoiding mechanical load.

The Special conditions for safe use of the types mentioned in the EC-Type-Examination Certificate ZELM 03 ATEX 0124X an the first and second supplement, are valid furthermore and will not be changed.

The Rotation speed sensors may be manufactured in future with this alternative marking.

Report No.

ZELM Ex 1000919714

Essential Health and Safety Requirements

Within the scope of this 3. Supplement the agreement of the device with the current standards has been checked.

The essential health and safety requirements are still fulfilled by compliance with the following Standards:

EN 60079-0:2006	EN 60079-11:2007
EN 61241-0:2006	EN 61241-11:2006

ZELM ex
Zertifizierungs-stelle

Braunschweig, July 30, 2009

Zertifizierungsstelle ZELM ex
Dipl.-Ing. Harald Zelm

ZELM ex

Sheet 2 of 2

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