DSF xx15.xx xHV Ex-Atex

Ex-Atex Certified

Two wire Hall Effect Speed Sensor

Product ID

Type #	Product #	Drawing #
DSF 1215.01 SHV Ex-atex (5m)	304Z-05197	113216
DSF 1415.01 AHV Ex-atex S148	304Z-05256	113351
DSF 1615.01 SHV Ex-atex (5m)	304Z-05196	113214
DSF 1615.05 AHV Ex-atex	304Z-05229	113303
DSF 1615.08 AHV Ex-atex	304Z-05232	113303
DSF 1615.11 AHV Ex-atex	3742607446	119174
DSF 1615.12 AHV Ex-atex	3742608778	119174
DSF 1815.01 AHV Ex-atex S173	304Z-05215	113255
DSF 2215.01 AHV Ex-atex	304Z-05163	113118
DSF 2215.01 AHV Ex-atex S13	304Z-05329	113118 S13
DSF 2215.01 AHV Ex-atex S175	304Z-05241	113321
DSF 2215.01 S2HV Ex-atex (5m)	304Z-05165	113122
DSF 2215.01 S3HV Ex-atex (10m)	304Z-05677	114827
DSF 2215.01 SHV Ex-atex (5m)	304Z-05164	113120
DSF 2215.02 AHV Ex-atex	304Z-05522	114360
DSF 2215.03 AHV Ex-atex	304Z-05633	114636
DSF EH15.01 AHV Ex-atex	304Z-05166	113124
DSF EH15.01 S2HV Ex-atex (5m)	304Z-05168	113128
DSF EH15.01 SHV Ex-atex (5m)	304Z-05167	113126

General

Function	The DSF xx15.xx xHV Ex-atex series speed sensors are suitable for use with a pole wheel to generate speed proportional frequency signals. They exhibit a static behaviour, whereby pulse generation down to 0 Hz is guaranteed. The sensing element is a magnetically biased Hall device, followed by a 2 wire amplifier. The sensors differ in housing sizes and connection.

Safety Notice	The speed sensors **DSF xx15.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 xx15.xx xHV Ex-atex** series sensors are certified according to EN 50014:1997 and EN 50020:2002 (see main certificate): ● Ⓔx **II 2 G EEx ia IIC T6** for use in flammable gas 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 0170X and its 1. Supplement must be observed. A copy of the EC Type Examination Certificate forms a constituent part of these operating instructions.

Technical data

Supply voltage	9 ... 18 VDC, protected against reverse polarity
Current consumption	Max. 10 mA
Signal output	The supply is provided from the non Ex environment via an 820 Ohm resistor. The current impulses generated are analysed on this resistor. Pulse levels of 2.2 V peak-peak are generated across the 820 Ohm resistor, with a d.c. component of ¾ supply voltage (see drawing). Short circuit proof and protected against reverse polarity.
Frequency range	0 Hz...15 kHz
Electromagnetic compatibility (EMC):	In accordance with 89/336/EG / EN 50081-2 / EN 50082-2: ▪ Electrostatic discharge into housing, cable shield and wires: up to ±4 kV peak according to IEC 61000-4-2, severity level 2 ▪ Radiated electromagnetic field: up to 30 V/m, 50% AM, 1 kHz in the range of 1 MHz to 1000 MHz according to IEC 61000-4-3, severity level 3 Electrical fast transients/bursts, coupled to sensor cable with a capacitive coupling clamp: up to ±4 kV peak according to IEC 61000-4-4, severity level 4
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** **50 Nm for M18x1** **75 Nm for M22x1** Dimensions according to drawing.
Cable	See below (type table).
Connector	See below (type table).
pole wheel	Toothed wheel of a magnetically permeable material (e.g. Steel 1.0036) • Minimum tooth width of 10 mm • Side offset < 0.2 mm • Eccentricity < 0.2 mm
Air gap sensor / pole wheel	Air gap between pole wheel (involute gear) and sensor housing: • Module 1: 0.2...1.0 mm • Module 2: 0.2...2.5 mm • Module 3: 0.2...3.5 mm • Module 4 (and larger): 0.2...4.5 mm For the following sensors the maximal air gaps listed above have to be reduced according to the value listed in the table and making it not useable for module 1 gears:

Sensor type	Maximal air gap reduced by
DSF 1715.01 AHV Ex-atex S3	0.4
DSF 1815.01 AHV Ex-atex	0.3
DSF 2215.01 AHV Ex-atex	0.3
DSF 2215.02 AHV Ex-atex	0.5
DSF 2215.03 AHV Ex-atex	0.3

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 gn in the range 5...2000Hz
Shock immunity	50 gn during 20 ms, half sine wave impact
Temperature	See tables on following pages. **The restrictions given in the EC Type Examination Certificate and its 1. supplement must be adhered to.** The minimum permissible operating temperature for all types is -20°C. The maximum permissible operating temperature depends upon the following parameters, as shown in the table below: · 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)
EX-Safety and Marking	**For this explosion proof sensors a copy of the European Certificate of Conformity ZELM 03 ATEX 0170X and its 1. Supplement is attached.** **See also below, the Ex related information in this documentation.** A connection diagram for use with Zener barriers is provided on the following pages. Protection class: II 2 G EEx ia IIC T6
Connection	The sensor wires are susceptible to radiated noise. The following 2 points should therefore be noted: • A screened 2 core cable must always be used for sensor connections. The screen must be taken all the way to the terminal provided on the instrumentation and not earthed. • The sensor cables should be laid as far as possible from large electrical machines and on no account laid parallel to high voltage/current power lines. The maximum permissible cable length is limited from a safety point of view according to the 1. Supplement of the Certificate of Conformity ZELM 03 ATEX 0170X. Furthermore it is a function of the sensor voltage, cable routing, the capacitance and inductance characteristics of the cable and the max. signal frequency. In general however, it is advisable to keep the distance between sensor and instrumentation as short as possible. The sensor cables can be extended using junction boxes having IP20 rated terminals. (corresponding to DIN 40050 or IEC 529) We recommend the use of JAQUET extension cable art. no. 824L-31081. The screen must be connected to **0 Volts at the analysing device.**
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.

Operating temperature for II 2 G EEx ia IIC T6-T1:

Sensor type or housing size	Maximum available electrical power [mW]	Maximum permissible operating temperature [°C] Ex hazardous areas: Temperature class						Example: Zener Barriers from STAHL (PTB 01 ATEX 2088) or JAQUET speed measuring devices (Connection diagrams see below)
		T1	T2	T3	T4	T5	T6	Power supply & signal path
DSF 1215.** to DSF 1715.** and DSF EH15.**	450	104	104	104	99	71	56	9001/01-168-050-101 or 9001/01-168-075-101 or 9001/01-168 -100-101 or 9001/01-126-075-101
	200	125	125	125	119	84	69	9001/01-168-020-101 or 9001/01-126-020-101
DSF 1815.** to DSF 2115.**	450	104	104	104	99	74	59	9001/01-168-050-101 or 9001/01-168-075-101 or 9001/01-168 -100-101 or 9001/01-126-075-101
	200	125	125	125	120	86	71	9001/01-168-020-101 or 9001/01-126-020-101
DSF 2215.**	450	104	104	104	99	77	62	9001/01-168-050-101 or 9001/01-168-075-101 or 9001/01-168 -100-101 or 9001/01-126-075-101
	200	125	125	125	120	87	72	9001/01-168-020-101 or 9001/01-126-020-101

Type table:

Sensor type	Product #	Housing & thread size (1)	Cable # (2)	Connector	Mating connector (3)	Operating temperature (1)
DSF 1215.01 SHV Ex-atex (5m)	304Z-05197	M12x1	824L-35053			Class T6-T1
DSF 1415.01 AHV Ex-atex S148	304Z-05256	M14x1		MS3102A-10SL-3P	MS3106A-10SL-3S	Class T6-T1
DSF 1615.01 SHV Ex-atex (5m)	304Z-05196	M16x1	824L-35053			Class T6-T1
DSF 1615.05 AHV Ex-atex	304Z-05229	M16x1		MS3102A-10SL-3P	MS3106A-10SL-3S	Class T6-T1
DSF 1615.08 AHV Ex-atex	304Z-05232	M16x1		MS3102A-10SL-3P	MS3106A-10SL-3S	Class T6-T1
DSF 1615.11 AHV Ex-atex	3742607446	M16x1		MS3102A-10SL-3P	MS3106A-10SL-3S	Class T6-T1
DSF 1615.12 AHV Ex-atex	3742607446	M16x1		MS3102A-10SL-3P	MS3106A-10SL-3S	Class T6-T1
DSF 1715.01 AHV Ex-atex S3	304Z-05213	M17x1		MS3102A-10SL-3P	MS3106A-10SL-3S	Class T6-T1
DSF 1815.01 AHV Ex-atex S173	304Z-05215	M18x1		MS3102A-10SL-3P	MS3106A-10SL-3S	Class T6-T1
DSF 2215.01 AHV Ex-atex	304Z-05163	M22x1		MS3102A-10SL-3P	MS3106A-10SL-3S	Class T6-T1
DSF 2215.01 AHV Ex-atex S13	304Z-05329	M22x1		MS3102A-10SL-3P	MS3106A-10SL-3S	Class T6-T1
DSF 2215.01 AHV Ex-atex S175	304Z-05241	M22x1		MS3102A-10SL-3P	MS3106A-10SL-3S	Class T6-T1
DSF 2215.01 S2HV Ex-atex (5m)	304Z-05165	M22x1	824L-36622			Class T6-T1
DSF 2215.01 S3HV Ex-atex (10m)	304Z-05677	M22x1	824L-35053			Class T6-T1
DSF 2215.01 SHV Ex-atex (5m)	304Z-05164	M22x1	824L-35053			Class T6-T1
DSF 2215.02 AHV Ex-atex	304Z-05522	M22x1		MS3102A-10SL-3P	MS3106A-10SL-3S	Class T6-T1
DSF 2215.03 AHV Ex-atex	304Z-05633	M22x1	824L-35053			Class T6-T1
DSF EH15.01 AHV Ex-atex	304Z-05166	5/8“-18 UNF-2A		MS3102A-10SL-3P	MS3106A-10SL-3S	Class T6-T1
DSF EH15.01 S2HV Ex-atex (5m)	304Z-05168	5/8“-18 UNF-2A	824L-36622			Class T6-T1
DSF EH15.01 SHV Ex-atex (5m)	304Z-05167	5/8“-18 UNF-2A	824L-35053			Class T6-T1

(1) 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 and its 1. supplement must be adhered to. For M17x1 the values for DSF 1815.** must be taken, for 5/8"-18 UNF-2A the values for DSF 1615.**.

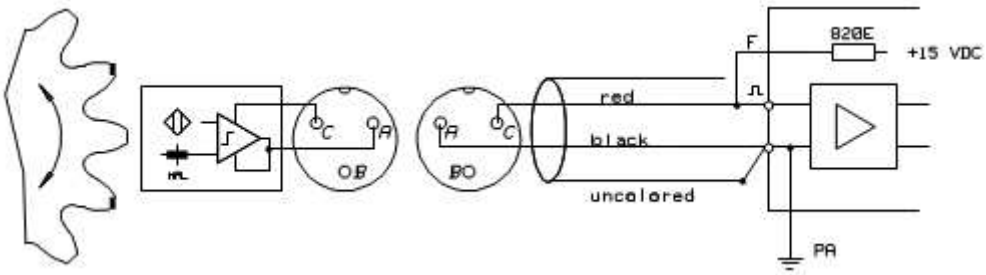
(2) Cables

Jaquet cable type	Properties
824L-35053	FEP Teflon cable, 4-wire (brown wire is not connected), 0.2 mm² (AWG 24), outer-Ø max. 4.2 mm, bending radius min. 60 mm, strand shielded screen (metal net), white Operating temperature: -100℃ to +150 ℃
824L-36622	Silicone cable, 6-wire, 0.6mm² (AWG 20), outer-Ø max. 13.0 mm, bending radius min. 65 mm, strand shielded screen (metal net), black Operating temperature: -40℃ to +150 ℃

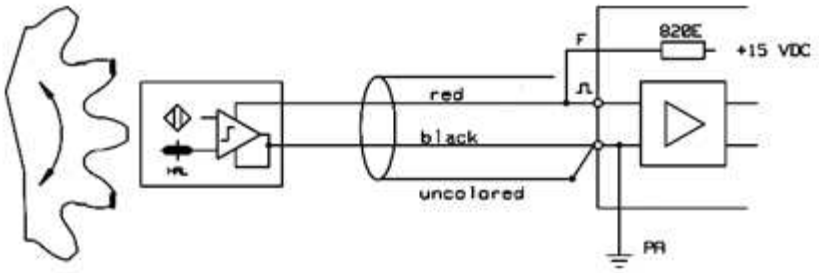
(3) Mating connector type MS 3106A-10SL-3S Jaquet part number: 820E-31141/820E-30691

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.

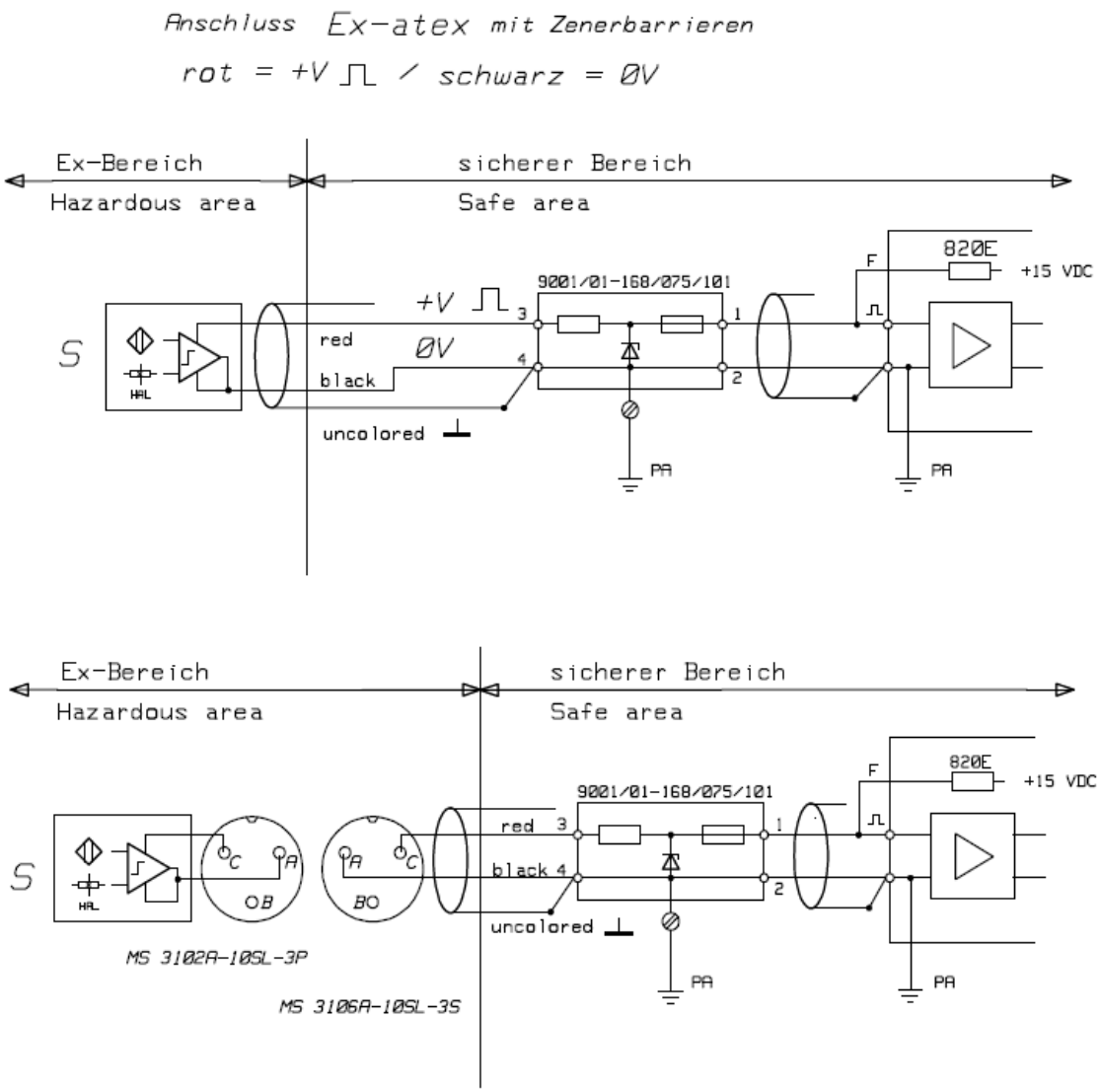
<u>Connection diagram sensor type DSF xx15.01 AHV Ex-atex</u> (for reference only, colors of wires may be different, check dimensional drawings):



<u>Connection diagram sensor type DSF xx15.01 SHV Ex-atex and DSF xx15.01 S2HV Ex-atex</u> (for reference only, colors of wires may be different, check dimensional drawings):



Connection using Zener barriers



CE-Declaration of Conformity

According to the CE guidelines

- Electromagnetic compatibility 89/336/EWG
- Apparatus used in explosive environment 94/4/EG

The apparatus

Type name : DSE ..15.xx .HV

Have been developed, and are constructed and produced in accordance with the guidelines 89/336/EG and 94/4/EG solely by :

Company : JAQUET AG, Thannerstrasse 15, CH-4009 Schweiz.

The following harmonised standards are applicable :

- EN 50081-2, EN 50011, CISPR 16
- EN 50082-2, EN 61000-4-2/3/4/5/6/8/11

- EN 50014
- EN 50020
- EN 50284
- EN 1127

- EN ISO 9001:2000

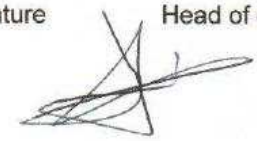
The following national standards are applicable :

- IEC 60068-2-1/2/30/6
- VDE 0165

Full technical documentation is available.
The associated instruction manuals are available under following numbers :

- 304D-64471 for DSE xxxx Ex Atex in original language.
- 304E-64471 for DSE xxxx Ex Atex in english.

Basel, the 25.08.2003 Signature Head of engineering



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 0170 X

(4) Equipment: **Rotation speed sensor type DSF .. 15.xx ..V Ex Atex**

(5) Manufacturer: **JAQUET AG**

(6) Address: **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 0900319224.

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

EN 50 014: 1997+A1+A2 **EN 50020: 2002**

(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

Zertifizierungsstelle **ZELM Ex**

Dipl.-Ing. Harald Zelm

Zertifizierungsstelle ZELM Ex

Braunschweig, November 26, 2003

Sheet 1/3

EC-type-examination Certificates without signature and stamp are not valid. The certificates may only be circulated without alteration. Extracts or alterations are subject to approval by the Prüf- und Zertifizierungsstelle ZELM Ex.
This English version is based on the German text. In the case of dispute, the German text shall prevail.

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

Prüf- und Zertifizierungsstelle

ZELM Ex

(13) **SCHEDULE**

(14) **EC-TYPE-EXAMINATION CERTIFICATE ZELM 03 ATEX 0170 X**

(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 .. 15.xx .. V Ex Atex

Version with firmly connected line
SH = teflon cable or
S2H = silicone cable or
AH = version with plug adapter

version differences irrelevant for security reasons

Thread size: 12 = M12
16 = M16
22 = M22
EH = 5/8" –18 UNF

Electrical data

Supply- and signal circuit — type of protection Intrinsic Safety EEx ia IIC

only for the connection to certified intrinsically safe circuits

maximum values: U_i = 18 V
I_i = 100mA
P_i = 450mW resp. 200 mW

Maximum effective inner capacity C_i = 16 nF

Maximum effective inner inductance L_i = 7,5 µH

The reactances of the 5m long connection cable are already considered within this data.

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 to be determined with the following table.

Prüf- und Zertifizierungsstelle

ZELM Ex

Schedule to EC-TYPE-EXAMINATION CERTIFICATE ZELM 03 ATEX 0170 X

Table 1

Type	P_i [mW]	max. ambient temperature for the temperature classes [°C]					
		T1	T2	T3	T4	T5	T6
DSF 12...	450	104	104	104	99	71	56
	200	125	125	125	119	84	69
DSF 16...	450	104	104	104	99	71	56
	200	125	125	125	119	84	69
DSF 22...	450	104	104	104	99	77	62
	200	125	125	125	120	87	72
DSF EH...	450	104	104	104	99	71	56
	200	125	125	125	119	84	69

(16) Report No.

ZELM Ex 0900319224

(17) Special conditions for safe use

1. The permissible ambient temperature range is to be determined according to the determination of this EC-Type-Examination Certificate.
2. The complete electrical data have to be taken from this EC-Type-Examination Certificate.
3. The instruction manual has to be considered.

(18) Essential Health and Safety Requirements

met by standards

Zertifizierungsstelle **ZELM Ex**

Dipl.-Ing. Harald Zelm

Zertifizierungs- und Prüfstelle ZELM Ex

Braunschweig, November 26, 2003

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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 0170 X

Equipment:	**Rotation speed sensor type DSF .. 15.xx ..V Ex Atex**
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 1130617488

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 Prüf- und ZELM Ex

Braunschweig, September 27, 2006

Sheet 1 / 1

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

CONTACT US

Tel +41 61 306 8822
jaquet.info@te.com

te.com/sensorsolutions