EXxxHyy Ex-Atex & NA

Variable Reluctance Speed Sensors
for use in explosive atmospheres
Europe ATEX II 2 G and
North America CII, Div 1 & 2 and Cl II,
Div 1 & 2 and Cl III and
North America Cl I, Zone 1

Product ID

Type #	Product #	Drawing #
EX34H	385Z-05637	114650
EX34H35	385Z-05638	114650
EX58H	385Z-05635	114647
EX58H35	385Z-05636	114647
EX58H35(5m)	3852613347	114647
EX58H85	385Z-05780	114647

General

Function

The sensors **EXxxHyy** are used to convert rotational and linear movement into electronic signals and consist of an iron core and induction coil mounted in front of a permanent magnet, with an electronic limiting circuit for output voltage and output current. A pole wheel rotating close to the sensor head affects the magnetic field and, according to the laws of induction, generates a voltage in the coil which is proportional to the rate of change of magnetic flux in the iron core. The magnitude of the sensor voltage depends on the distance between pole wheel/sensor, the dimensions of the poles and is more or less proportional to the rotational speed of the pole wheel. An electromagnetic sensor requires no auxiliary power supply for signal generation.

Safety Information

The speed sensors **EXxxHyy** are certified for applications in areas with explosive atmospheres according to EX ATEX and CSA standards. These types are to be duly used in undamaged and clean condition. Modifications of sensors are prohibited if not expressly listed in this operating instruction.

for EX ATEX ia usage:

All requirements of the EC-Type Examination Certificate, its 1st, 2nd, 3rd and 4th supplement (part of this operating instruction) and appropriate standards (e. g. IEC 60079-14 or DIN VDE 0165) must be fulfilled. In particular the circumferential velocity given in table 2 must not be exceeded and the minimal air gap given in table 2 must be guaranteed.

for CSA usage:

ENGLISH:

- **WARNING – Explosion Hazard. Do not connect or disconnect this equipment unless power has been removed or the area is known to be nonhazardous.**
- **WARNING – Explosion Hazard. Substitution of components may impair suitability for Class I, Division 2.**
- **The CSA Certificate of Compliance is an integral part of these operating instructions. All limitations and requirements must be fulfilled.**
- ⚠ **(ISO 3864, No. B.3.1)**
  WARNING – Symbol indicates that all the specifications (electrical rating, required cautions, other related information) in the operating instructions have to be considered.

FRANCAIS:

- **AVERTISSEMENT – Danger d'explosion. Ne pas connecter ou déconnecter cet equipement tant que l'alimentation n'est pas coupée ou que l'environnement soit reconnu comme non-dangereux.**
- **AVERTISSEMENT – Danger d'explosion. La substitution de composants peut rendre cet equipement impropre à une utilisation en Classe I, Division 2.**
- **Le certificat de conformité CSA fait partie intégrante de ce manuel d'utilisation; Les exigences et restrictions mentionnées dans celui-ci doivent être respectées.**
- ⚠ **(ISO 3864, No. B.3.1)**
  AVERTISSEMENT – Ce symbole indique que les informations (specification électrique, précautions nécessaire ou autres informations afférentes) du manuel d'utilisation doivent être considérées et respectées.

Conformity to Standards

EXxxHyy series sensors are certified according to the following standards.

EX ATEX ia usage:

EN 60079-0: 2012 + A11:2013 and EN 60079-11: 2012 (see 4th supplement of the certificate):

- Ex **II 2 G Ex 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 0138X, its 1st , 2nd, 3rd and 4th supplement must be observed.

for CSA usage:

The sensors are CSA listed for use in hazardous locations.

- Canadian standards:
  - Class I, Division 1 & 2, Groups A, B, C & D; Class II, Division 1 & 2, Groups E, F & G; Class III
  - Class I, Zone 1 IIC CAN
- US standards:
  - Class I, Division 1 & 2, Groups C & D; Class II, Division 1 & 2, Groups E, F & G; Class III
  - Class I, Zone 1 IIB US
- Output rated:
  - 13.0Vac, 10.0mA nominal.

Technical data

Signal output	Using a sensor together with a toothed wheel having an involute gear form will generate a sinusoidal signal. Analyzing the frequency will determine the rotational speed. The signal amplitude is proportional to the rate of change of magnetic flux generated by the pole wheel. In principle, it depends on the following parameters: ○ Circumferential velocity of the toothed wheel ○ Module of the toothed wheel ○ Air gap between toothed wheel and sensor's front surface ○ Load impedance applied to the sensor Figure 1 shows the maximum Peak-Peak voltage, which can be achieved with the different sensor models. Please note that the min/max signal amplitudes should be dimensioned in such a way as to be compatible with the instrumentation (trigger level and max I/P voltage). A trigger level of 50mVrms is used as standard with Jaquet tachometers. Note: For use in Ex zones the lower air gap limits shown in table 2 must not be reduced. The minimum measurable speed is then derived from the frequency which generates a minimal amplitude of 50mVrms.

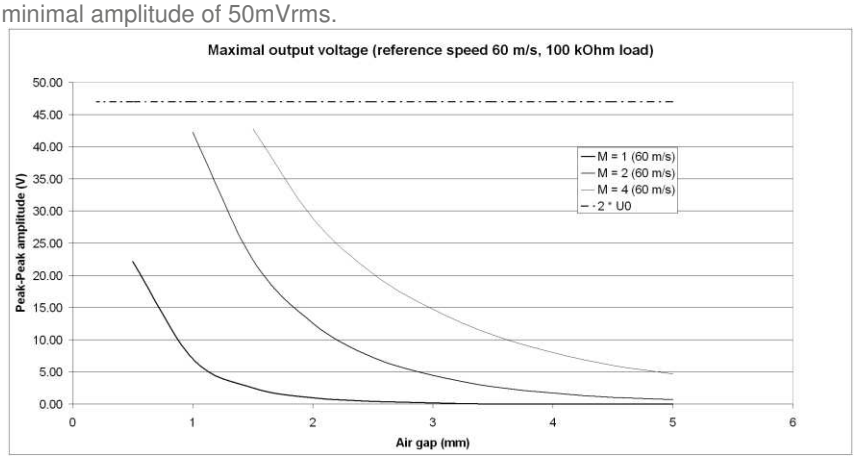


Figure 1: Maximal output voltage of the sensor

Legend:

- M=1: Gear with module 1 mm corresponds to 25.4 DP
- M=2: Gear with module 2 mm corresponds to 12.7 DP
- M=4: Gear with module 4 mm corresponds to 6.4 DP
- U0: Ignition limit for intrinsically safe circuits according to EN 60079-11

Frequency range	Minimum frequency (depending on application) ...20 kHz
Electromagnetic compatibility	According to 2014/30/EU, EN 61000-6-2, EN 61000-6-4
Insulation	Housing, cable shield and coils galvanically isolated (500V / 50Hz / 1min)
Housing	Stainless machining steel X12CrNiS18 8, material no. 1.4305, front side hermetically sealed. Electronic components potted in chemical and age proof synthetic resin. Dimensions according to drawing. Maximum allowed fixing torque: - 35 Nm for 5/8"-18 UNF-2A - 40 Nm for 3/4"-20UNEF-2A
Protection class	IP68 (head), IP67 (cable entrance)
Vibration immunity	5 gn in the range of 5...2000 Hz

Shock immunity	50 gn during 20 ms, semi-sinusoidal shock
Pole wheel	Requirements: Toothed wheel of a ferrous material (e.g. Steel 1.0036). Optimal performance with Involute gear ○ Tooth width > 10 mm ○ Side offset < 0.2 mm ○ Eccentricity < 0.2 mm
Air gap between sensor And pole wheel	Depending on lowest circumferential speed which has to be detected, on trigger level and ex safety parameters (see Figure 1).
for EX ATEX ia usage:	The minimal air gap, given in table 2 must be guaranteed. **WARNING: Setting an air gap which is too small, can result in a hazardous event**.
Coil properties	• Inductance @ 1 kHz: 55 mH ± 20% • Resistance of entire sensor: 2950 Ohm ± 5% (internal passive electronics: 2700 Ohm, coil: 250 Ohm) • Magnet polarity: south pole towards front face • Pole piece: diameter 2.7 mm
Polarity	Upon approach of ferrous metal, the signal pin is positive with respect to GND.
Cable	PTFE cable, article no. 304F-73583, 3-pole, 3 x 0.21 mm² (AWG 24), shielded (metal net insulated from the housing), outer-Ø max. 3.7 mm. The brown lead is not connected and has to be isolated during installation.
Operating temperature - for EX ATEX ia usage:	See Table 1, note “EC-Type Examination Certificate”. Max. operating temperature is dependent on the following parameters: • Size of sensor housing • Maximum available electrical power from the intrinsically safe input circuit of the attached Ex speed measuring device or from the Zener barriers • Ex temperature class (T1-T6) • Type of sensor
- for CSA usage:	-40°C…150°C

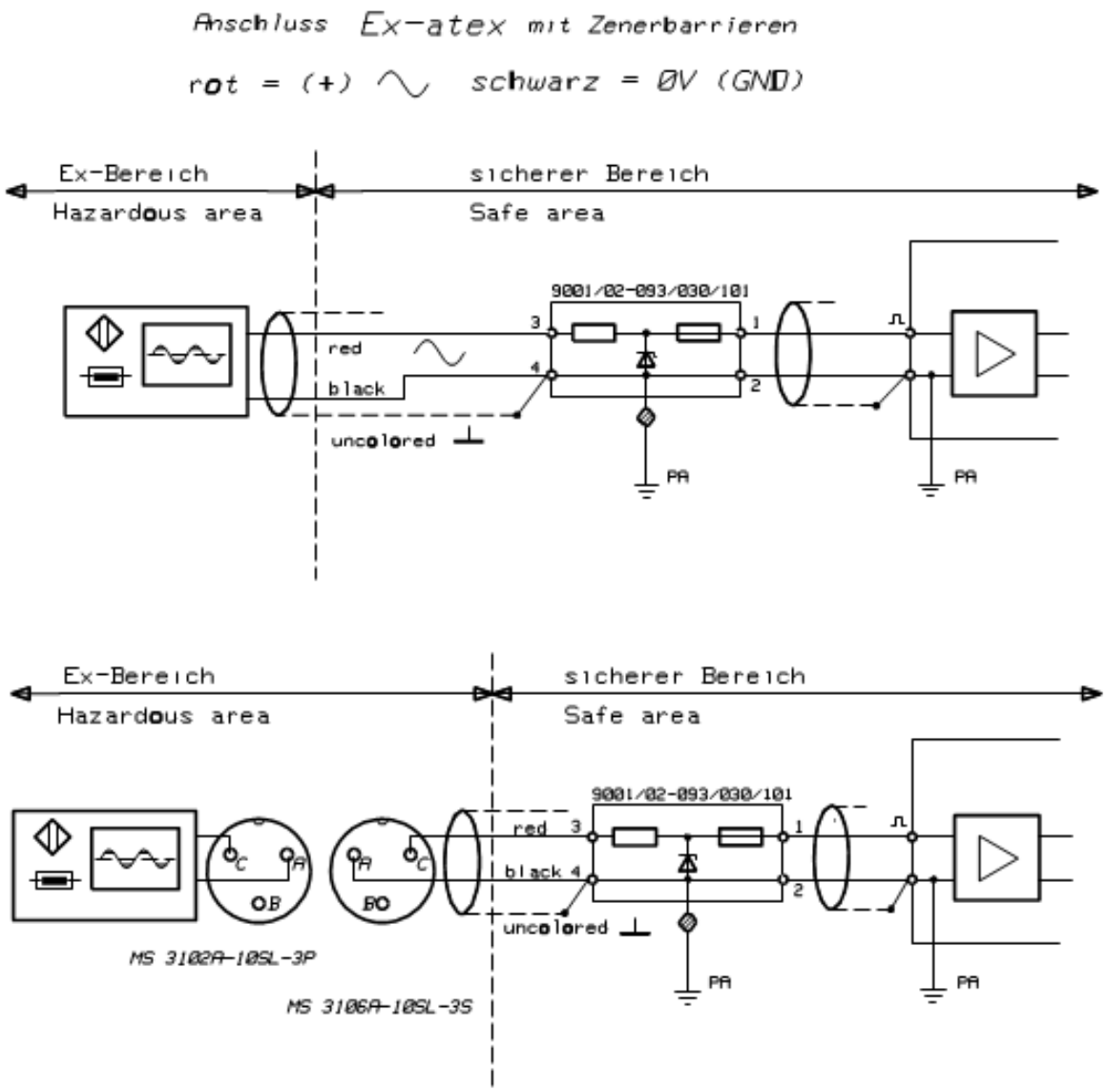
Table 1: Operating temperature, output and housing for EX ATEX ia usage: Ⓔx II 2 G Ex ia IIC T6

Sensor type resp. housing size	Max. available electrical output [mW]	Max. allowed operating temperature [°C] Ex-endangered plant locations: temperature class						Examples for STAHL Zener-barriers (PTB 01 ATEX 2053 + 2088) or Ex speed measuring devices from JAQUET Technology Group AG	System Resistance nominal Ohm	
		T1	T2	T3	T4	T5	T6	Signal path	Coil	System compl.
EXxxHyy	0	150	150	150	124	89	74	-	250	2950
	100	150	150	150	119	84	69	-	250	2950
	200	125	125	125	111	76	61	-	250	2950
	300	100	100	100	100	69	54	-	250	2950
	400	80	80	80	80	61	46	9002/77-280-094-001	250	2950

Ex-Safety and Marking	All mechanical installations must be carried out by an expert. General safety requirements have to be met. For Ex safety relevant issues the applicable standards have to be met in addition to the requirements of this operating instruction. Notified body for the certification of the Jaquet quality management system to the requirements of the ATEX directive 2014/34/EU and the IECEx system is PRIMARA Test- und Zertifizier-GmbH. On ATEX products the CE-marking is accompanied by PRIMARA's certification identification number 2572. The previous identification number 0820 (Zelm Ex) is no longer valid. Although the old number might still appear on drawings, it will be replaced by the new number. The products itself are already marked with the new number.
Connection	The sensor wires are sensitive to electrical interference. Therefore, the following points should be noted: • A screened two-core cable must always be used for the sensor connections. The screen must be taken all the way to the terminal provided on the instrument and must be connected according to the intrinsically safe circuit concept. • The sensor cables should be laid as far away as possible from large electrical machines, and on no account, be laid parallel to high-voltage/current power lines. The maximum permissible cable length is a function of the sensor voltage, cable routing, the capacitance and inductance characteristics of the cable and the max. signal frequency. The sensor cables may be extended by interposing junction boxes having type IP20 terminals (conforming to DIN 40050). We recommend JAQUET cables as extension cables (JAQUET art. no.824L-31841). In general, it is advisable to keep the distance between the sensor and the associated instruments as short as possible. For electrical connection of the sensors consult the dimensional drawings.
for EX ATEX usage inductance	In addition, the maximum permissible cable length is limited to by the capacitance and as stated in the 1st supplement of ZELM 03 ATEX0138X. In Figure 2 an example of the connection of Zener barriers is shown.
Installation	Installation usage in explosive environments: The (locally) valid directives must be followed strictly (e.g. EN 60079-14). The sensor has to be mounted with the centre of its face over the pole centre. With gear wheels or slots and radial sensor mounting, the sensor is usually mounted over the middle of the wheel. Dependent on the wheel width a certain axial displacement of the pole wheel is then permissible. The centre of the sensor should however, be positioned at least 3 mm away from the edge of the wheel end under all operating conditions. **Rigid vibration-free mounting of the sensor is vital.** Vibration of the sensor with respect to the pole wheel induces additional impulses. The sensors are insensitive to oil, lubricants, etc. and may be used in harsh operating conditions. When fitting the sensor, the minimum permissible pole wheel-sensor distance should be selected. This distance must be such that the transmitter on no account brushes against the pole wheel. The pole wheel- sensor distance has no influence on the calibration of the overall system. The sensor needs to be protected from mechanical impact, in case of exposed compound, according to the special condition mentioned in the 4th supplement.
Wiring	According to sensor drawing.
Grounding	The sensor housing must be connected to protective earth.
Maintenance	Sensors are maintenance-free. The sensors are fully potted and sealed and cannot be repaired.
Transport	Product must be handled with care to prevent damage of the front face.
Storage	Product must be stored in dry conditions. The storage temperature corresponds to the operation temperature.
Disposal	Product must be disposed of properly; it must not be disposed as domestic waste.

Table 2: Minimal air gap for Ex ATEX ia usage.

Measuring system	Module 1	Module 2	Module 4
EXxxHyy Reference circumferential velocity 60 m/s	0.4 mm	0.2 mm	1.8 mm



JAQUET TECHNOLOGY GROUP	Formular **QM 5.F9 Rev. 4:** **Konformitätserklärung**	Ersteller: **RW**	Freigabe: **SMI**	Datum: **05/2014**

EU Declaration of Conformity
(in accordance with ISO/IEC 17050-1)

We,

JAQUET Technology Group AG Thannerstrasse 15 CH-4009 Basel	As of **01.01.2018** our new address will be: **JAQUET Technology Group AG** Kunimattweg 14 CH-4133 Pratteln

certify and declare under our sole responsibility that the following product(s)

Variable Reluctance Single Channel Speed Sensor
EXxxHyy

as delivered, are in conformity with the essential requirements of the following directives:

2014/30/EU	Electromagnetic Compatibility Directive
2014/34/EU	ATEX Directive

Conformity to the directives is assured through the application of the following harmonized standards:

EN 60079-0:2012 + A11:2013 (IEC 60079-0:2011) EN 60079-11:2012 (IEC 60079-11:2011)	Explosive atmospheres – Part 0: Equipment – General requirements Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"
EN 61000-6-2:2005/AC:2005 (IEC 61000-6-2:2005)	Immunity standard for industrial environments
EN 61000-6-4:2007/A1:2011 (IEC 61000-6-4:2006)	Emission standard for industrial environments

Additional European and international standards are applicable:

EN ISO 9001:2008	Quality Management Systems

Additional information:
-

Basel, 20.06.2017

Wolfgang Schnell
Engineering & Technology Manager

Thomas Barth
Head of Quality Department

CSA Group

Certificate of Compliance

Certificate: 2047906 **Master Contract:** 237563

Project: 70040624 **Date Issued:** 2015-09-23

Issued to: **Jaquet Technology Group**
15 Thannerstrasse
Basel, 4009
SWITZERLAND
Attention: Wolfgang Schnell

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.

C US

Issued by: *Siros Ghanbarzadeh*
Siros Ghanbar-zadeh

PRODUCTS

CLASS - C225802 - PROCESS CONTROL EQUIPMENT-For Hazardous Locations-
CLASS - C225882 - PROCESS CONTROL EQUIPMENT-For Hazardous Locations - Certified to US Standards

CLASS 2258 02 - PROCESS CONTROL EQUIPMENT - For Hazardous Locations

Class I, Division 1 and 2, Groups A, B, C and D; Class II Division 1 and 2, Groups E, F, and G; Class III:
Models EX34H, EX34H35, EX58H, EX58H35, EX58H35(5m) and EX58H85 Electromagnetic Speed Sensor, output rated
13.0Vac, 10.0mA nominal.

CLASS 2258 82 - PROCESS CONTROL EQUIPMENT - For Hazardous Locations - CERTIFIED TO U.S. STANDARDS

Class I, Division 1 and 2, Groups C and D; Class II Division 1 and 2, Groups E, F, and G; Class III:
Models EX34H, EX34H35, EX58H, EX58H35, EX58H35(5m) and EX58H85 Electromagnetic Speed Sensor, output rated
13.0Vac, 10.0mA nominal.

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CSA Group

Certificate: 2047906 **Master Contract:** 237563
Project: 70040624 **Date Issued:** 2015-09-23

CLASS 2258 02 - PROCESS CONTROL EQUIPMENT - For Hazardous Locations

CLASS 2258 82 - PROCESS CONTROL EQUIPMENT - For Hazardous Locations - CERTIFIED TO U.S. STANDARDS

Class I, Division 2, Groups A, B, C and D:
Models EX10A, EX10S, EX12A, EX12A35, EX38A, EX38S, EX58AM, EX58AM25, EX58AM40, EX58S, EX58S25 and EX58S40 Electromagnetic Speed Sensor, output rated 30.0Vac/ 10.0 mA nominal.

Notes:
1) Set-up must limit output voltage to 30Vac max.
2) Certified as Component and required to be housed in suitable enclosure where the final combination is subjected to acceptance by the local Authority Having Jurisdiction.

APPLICABLE REQUIREMENTS

CAN/CSA-C22.2 No. 0-10 (R 2015)	- General Requirements – Canadian Electrical Code, Part II
CSA C22.2 No. 30-M1986 (R 2012)	- Explosion-Proof Enclosures for Use in Class I Hazardous Locations
CSA C22.2 No. 142-M1987 (R 2014)	- Process Control Equipment
CSA C22.2 No. 213-M1987 (R 2013)	- Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations
CSA C22.2 No 25-1966 (R 2014)	- Enclosures for Use in Class II Groups E, F and G Hazardous Locations
UL 916 (4th Ed.) (R2014)	- Energy Management Equipment
UL 1203 (5th Ed.) (R2015)	- Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations
UL 1604 (3rd Ed.) (1994) (R2004)	- Electrical Equipment for Use in Class I and II, Division 2; Class III Hazardous (Classified) Locations
ANSI/ISA-12.12.01-2013	- Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations

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CSA Group

Certiticate: 2047906 Master Contract: 237563
Project: 70040624 Date Issued: 2015-09-23

MARKINGS

The manufacturer is required to apply the following markings:

- Produds shall be marked wilh the markings specified hy the particular producl standard.
- Produds certified for Canada shall have all Caulion and Warning markings in holh English and rrench.

Additional bilingual markings not covered by the product standard(s) may be required by the Authorities Having .lurisdiction. It is the responsihility of the manufacturer to provide and apply these additional markings, where applicahle, in accordance with the requirernentof thoe authorities.

The following reduced markings are etched or perrnanently engraved on the sensor hou ing, or provided on an etched metal nameplate, permanently attached with non-removable fasteners:

- Manufacturer's name "Jaquet Technology Gmup" or CSA Master Contract Numher "237563" inlieu of manufacturer's name, adjacenl to Lhe CSA Mark.
- Modelnumber: l\.s specified in the PRODUCTS section. above.

- TIle CSA Mark, witll or without adjacent ··C· and "US" incticators, as shownon the Certificate of Confonnity;
- Hazardous Localions designalion: As spedfied in the PRODUCTS section. above. (may be abbreviated)

i\n installation matmal or data sheet shall be supplied with each unit. The following minimum content shall be included in this document:

- Specification for appropriate mounting, grounding, and wiring. including definition of lead color functions.
- The following words, or suitahle equi valent:
  - This equipment (EX34H, EX34H35. EX58H. EX58H35, EX58H35 (5m) and EX58H85) is suitable for installation in Cla.s I, Division 1 and 2, Group A, B, C and D hazardous locations or nonha7.ardous locations only.
  - This equipment (EX1OA, EX1OS, EX12!\., EX12!\.35, EX38!\., EX38S, EX58!\.M, EX58!\.M25, EX58AM40, EX58S, EX58S25 and EX58S40) is suitahle for installation in Class I, Division 2, Group A, B, C and D hazardous locations or nonhaza rdous locations only.
  - WI\.RNING - Explosion Hazard. Du nul cunnect or discunnecl Lhis equipmenl unless power has been removed or the area is known to he nonhazardous.
  - WARNING - Explosion Ha7.ard. Substitution of componentmay impair suitahility for Class I, Division 2.
  - Eledrü;al rating

DQD 507 Rev. 2012-05-22 p

CSA Group

Certificate: 2047906 **Master Contract:** 237563
Project: 70040624 **Date Issued:** 2015-09-23

Based on TN-076

Optional Hazardous Location designation of CI I Zone 1 IIC CAN and CI I Zone 1 IIB US can also appear on the following speed sensor models:

EX58H, EX58H35, EX58H35 (5m), EX58H85, EX34H, EX34H35

Optional Hazardous Location designation of CI I Zone 2 IIC CAN and CI I Zone 2 IIB US can also appear on the following speed sensor models:

EX10A, EX10S, EX12A, EX12A35, EX38A, EX38S, EX58AM, EX58AM25, EX58AM40, EX58S, EX58S25 and EX58S40

DQD 507 Rev. 2012-05-22 Page 4

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 0138X

(4) Equipment: **Rotation speed sensor type DSE xxyy.zz *HZ 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 0360215180.

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

EN 50 014: 1997+A1+A2 **EN 50020: 1994**

(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**

Adolf Gruber

Zertifizierungs- und Prüf- stelle ZELM Ex

Braunschweig, July 1st, 2003

Sheet 1/4

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 0138X**

(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 DSE xxyy.zz .HZ Ex

- Version with firmly connected line
  S = teflon cable or
  S2 = silicone cable or
  A = version with plug adapter
- 21, 22, 23 see "Electrical specifications"
- Appropriate pole-wheel module
- Thread size:
  16 = M16
  18 = M18
  20 = M20
  22 = M22
  EH = 5/8" –18 UNF

Electrical data

Supply- and signal circuit

type of protection Intrinsic Safety EEx ia IIC
type DSE xxyy.21 .HZ Ex

maximum values: U_o = 23,5 V
I_o = 10 mA
P_o = 58 mW
(linear output characteristic)

maximum permissible external inductance L_o = 300 mH
maximum permissible external capacity C_o = 132 nF

resp.

types DSE xxyy.22 .HZ Ex und DSE xxyy.23 .HZ Ex

maximum values: U_o = 7 V
I_o = 10 mA
P_o = 17 mW
(linear output characteristic)

maximum permissible external inductance L_o = 300 mH
maximum permissible external capacity C_o = 15,7 µF

resp.

Prüf- und Zertifizierungsstelle

ZELM Ex

Schedule to EC-TYPE-EXAMINATION CERTIFICATE ZELM 03 ATEX 0138X

only for connection to certified intrinsically safe circuits

maximum values: U_i = 30 V
I_i = 100 mA
P_i = 400 mW (in accordance with table 1)
(linear output characteristic)

The maximum effective inner inductance and capacitance are negligibly small

The lower temperature boundary conducts 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.

Table 1

		maximum ambient temperature for the temperature classes					
type	P_i	T1	T2	T3	T4	T5	T6
	[mW]						
DSE 16xx.21	0	150	150	150	124	89	74
DSE 18xx.21	100	150	150	150	119	84	69
DSE 20xx.21	200	125	125	125	111	76	61
DSE 22xx.21	300	100	100	100	100	69	54
DSE EH10.21	400	80	80	80	80	61	46
DSE 16xx.22	0	185	185	185	128	93	78
DSE 18xx.22	10	185	185	185	128	93	78
DSE 20xx.22	50	175	175	175	127	92	77
DSE 22xx.22	100	150	150	150	125	90	75
DSE EH10.22							
DSE 16xx.23	0	185	185	185	128	93	78
DSE 18xx.23	10	185	185	185	128	93	78
DSE 20xx.23	50	175	175	175	127	92	77
DSE 22xx.23	100	150	150	150	125	90	75
DSE EH20.23							

(16) Report No.

ZELM Ex 0360215180

(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 compliance of the limiting values for the maximum circumferential speed of 60 m/s with model DSE .....21 resp. 4,7 m/s for the further versions is to be guaranteed.

Sheet 3/4

Prüf- und Zertifizierungsstelle

ZELM Ex

Schedule to EC-TYPE-EXAMINATION CERTIFICATE ZELM 03 ATEX 0138X

4. The compliance of the minimum air gaps in accordance with the information in the operating instruction is to be guaranteed
5. The instruction manual has to be considered.

(18) Essential Health and Safety Requirements

met by standards

Zertifizierungsstelle **ZELM Ex**

Zertifizierungs- und Prüf- stelle ZELM Ex

Braunschweig, July 1st, 2003

Adolf Gruber

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 0138 X

Equipment:	**Rotation speed sensor type DSE xxyy.zz *HZ 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 1110617486

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

Sheet 1 / 1

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2. Supplement

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

ZELM ex

to EC-type-examination Certificate

ZELM 03 ATEX 0138 X

Equipment:	**Rotation speed sensor type DSE xxyy.zz *HZ Ex**
Manufacturer:	**JAQUET AG**
Address:	**Thannerstrasse 15, CH-4009 Basel**

Description of supplement

The 2. Supplement concerns the agreement of the rotation speed sensors with the requirements of the current standards. The marking of the rotation speed sensors is in future:

Ex **II 2 G Ex ia IIC T6**

Furthermore model series of the rotation speed sensors will be extended by additional variations. The type designation of these additional versions is:

Rotation speed sensor type EXxxHyy

The signs „xx" and „yy" will be replaced each with a two-digit number. The sign „xx" indicates the thread size in such a manner that the first digit stands for the numerator and the second digit stands for the denominator of the fraction. For example the number 34 specifies the thread size ¾ inch. The sign „yy" indicates the shaft length in tenth of an inch. For example the number 85 specifies the shaft length of 8.5 inch.

Electrical data

Supply- and signal circuit: type of protection Intrinsic Safety Ex ia IIC
Rotation speed sensor type EXxxHyy

maximum values: U_o = 23.5 V
I_o = 10 mA
P_o = 58 mW
(linear output characteristic)

maximum permissible external inductance L_o = 300 mH
maximum permissible external capacity C_o = 132 nF

resp.

only for connection to certified intrinsically safe circuits

maximum values: U_i = 30 V
I_i = 100 mA
P_i = 400 mW (in accordance with table 1)
(linear output characteristic)

The maximum effective inner inductance and capacitance are negligibly small
The 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 = 1,5µH/m

Sheet 1 of 3

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2. Supplement to EC-type-examination Certificate ZELM 03 ATEX 0138 X

ZELM ex

The lower temperature boundary conducts 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 Rotation speed sensor type EXxxHyy are to be determined with the following table.

Table 1

type	P_i	maximum ambient temperature for the temperature classes					
		T1	T2	T3	T4	T5	T6
	[mW]						
EXxxHyy	0	150	150	150	124	89	74
	100	150	150	150	119	84	69
	200	125	125	125	111	76	61
	300	100	100	100	100	69	54
	400	80	80	80	80	61	46

Special conditions for safe use

The Special conditions for safe use No. 3 will be modified and reads as follows in the future:

3. The compliance of the limiting values for the maximum circumferential speed of 60 m/s with type DSE .....21 and type EXxxHyy resp. 4,7 m/s for the further versions is to be guaranteed.

All further special conditions for safe use as well as the electrical and technical data for the already certified versions according to the EC-Type Examination Certificate remains 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 1910926760

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

ZELM ex
Zertifizierungs-stelle

Braunschweig, January 22, 2010

Zertifizierungsstelle ZELM ex
Dipl.-Ing. Harald Zelm

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Sheet 2 of 2

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3. Supplement

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

ZELM ex

to EC-type-examination Certificate

ZELM 03 ATEX 0138 X

Equipment:	**Rotation speed sensor type DSE xxyy.zz *HZ Ex resp. EXxxHyy**
Manufacturer:	**JAQUET AG**
Address:	**Thannerstrasse 15, CH-4009 Basel**

Description of supplement

The 3rd Supplement concerns the evaluation of the rotation speed sensors against the requirements of the current standards, and the extension of the model series with one additional type. The type designation of the additional type is:

Rotation speed sensor DSE 2020.21 SHZ Ex

The marking of the Rotation speed sensor DSE 2020.21 SHZ Ex is as follows:

⟨Ex⟩ **II 2 G Ex ia IIC T6**

The electrical data for the Rotation speed sensor DSE 2020.21 SHZ Ex is as follows:

Supply- and signal circuit

type of protection Intrinsic Safety Ex ia IIC
maximum values: U_o = 23.5 V
I_o = 10 mA
P_o = 58 mW
(linear output characteristic)
maximum permissible external inductance
L_o = 300 mH
maximum permissible external capacity
C_o = 132 nF

resp.
only for connection to certified intrinsically safe circuits
maximum values: U_i = 30 V
I_i = 100 mA
P_i = 400 mW (in accordance with table 1)
(linear output characteristic)

The maximum effective inner inductance and capacitance are negligibly small.
The 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

3. Supplement
to EC-type examination Certificate ZELM 03 ATEX 0138 X

ZELM ex

The lower temperature boundary conducts for the type DSE 2020.21 SHZ Ex -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 Rotation speed sensor type DSE 2020.21 SHZ Ex are to be determined with the following table.

Table 1

type	P_i	maximum ambient temperature for the temperature classes					
		T1	T2	T3	T4	T5	T6
	[mW]						
DSE 20xx.21	0	150	150	150	124	89	74
	100	150	150	150	119	84	69
	200	125	125	125	111	76	61
	300	100	100	100	100	69	54
	400	80	80	80	80	61	46

Report No.

ZELM Ex 0691319992

Special conditions for safe use

For the rotation speed sensor type DSE 2020.21 SHZ Ex the special condition for safe use No. 4 are additional valid:

4. The maximum circumferential speed for the rotation speed sensor type DSE 2020.21 SHZ Ex shall be not more than 138 m/s, the minimum air gap to the pole wheel shall be not less than 0.5 mm. For applications with the above mentioned boundary conditions only a pole wheel or a shaft with slots of 4 mm width and 5 mm depth shall be used.

The rotation speed sensors types DSE xxyy.zz *HZ Ex resp. EXxxHyy can be manufactured in future under consideration of this supplement.

Essential Health and Safety Requirements

The essential Health and Safety Requirements are fulfilled by compliance with the following Standards:

EN 60079-0:2012 **EN 60079-11:2012**

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Zertifizierungs-stelle

Braunschweig, 2013-07-19

Zertifizierungsstelle ZELM ex
Dipl.-Ing. Harald Zelm

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4. Supplement

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

ZELM ex

to EC-type-examination Certificate

ZELM 03 ATEX 0138 X

Equipment:	**Rotation speed sensor types DSE xxyy.zz *HZ Ex resp. EXxxHyy**
Manufacturer:	**JAQUET AG**
Address:	**Thannerstrasse 15, CH-4009 Basel**

Description of supplement

The 4. Supplement concerns the change of the name of the manufacturer and the examination for compliance of the equipment to the current Standards. The name of the manufacturer is in future

JAQUET Technology Group Ltd

The marking, the electrical and all other technical data according to the EC-type-examination Certificate ZELM 03 ATEX 0138 X including the 1., 2. and 3. Supplement remain unchanged and are also valid for this 4. Supplement.

The Special conditions for safe use are extended by the Special condition for safe use No. 5:

5. The equipment shall be installed in a way that the free surface of the casting compound is protected from mechanical impacts. This can be achieved by installing the sensor into a wall of an enclosure with a degree of protection IP20 in a way that the connection side ensures a degree of protection IP20 or if the installation ensures in another suitable way, that mechanical impacts on the surface of the casting compound or the edge of the sensor enclosure are not possible.

The rotation speed sensors shall only be manufactured in future according to this 4. Supplement.

Report No.

ZELM Ex 07514131073

Essential Health and Safety Requirements

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

EN 60079-0:2012 + A11:2013 **EN 60079-11:2012**

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Zertifizierungs-stelle

Braunschweig, 2015-05-07

Zertifizierungsstelle ZELM ex
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