



## Translation

# EC-Type Examination Certificate

- (1)
- (2) **- Directive 94/9/EC -**  
**Equipment and protective systems intended for use**  
**in potentially explosive atmospheres**
- (3) **BVS 05 ATEX E 091**
- (4) **Equipment:** Force Sensor type \*\*\* \*\* \* \*\*\*-F
- (5) **Manufacturer:** HAEHNE GmbH
- (6) **Address:** 40699 Erkrath, Germany
- (7) The design and construction of this equipment and any acceptable variation thereto are specified in the appendix to this type examination certificate.
- (8) The certification body of EXAM BBG Prüf- und Zertifizier GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council 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 test and assessment report BVS PP 05.2061 EG.
- (9) The Essential Health and Safety Requirements are assured by compliance with:
- EN 50014:1997 + A1 – A2 General requirements  
EN 50020:2002 Intrinsic safety 'i'
- (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 appendix to this certificate.
- (11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC.  
Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate
- (12) The marking of the equipment shall include the following:

 **II 2G EEx ia IIC T4**

**EXAM BBG Prüf- und Zertifizier GmbH**

Bochum, dated 20. June 2005

Signed: Dr. Jockers

Signed: Dr. Eickhoff

\_\_\_\_\_  
Certification body

\_\_\_\_\_  
Special services unit

(13) Appendix to

(14) **EC-Type Examination Certificate**

**BVS 05 ATEX E 091**

(15) 15.1 Subject and type

Force Sensor type \*\*\* \*\* \* \*\*\*-F

In place of \*\*\* the complete description characters and numeric are inserted which specify the application:

Type \*\*\* \*\* \* \*\*\*-F

not ex-relevant identifications such as force measuring range,  
type of building, size, sensor designation

15.2 Description

The force sensor is used for the acquisition of tension and compression forces and the conversion of this signal into a proportional electrical signal.

The sensor consists of strain gauges in a bridge circuit which are glued on a gauging member.

The force sensor is a simple apparatus according to section 5.4 of EN 50020 :2002.

The electrical connection of the sensor to a corresponding control unit is made with a fixed cable with maximum 20 m in lengths.

15.3 Parameters

Voltage	Ui	DC	17	V
Current	Ii		500	mA
Power	Pi		2	W
Effective internal capacitance	Ci		3.2	nF
Effective internal inductance	Li		14	μH
Ambient temperature range	Ta		-20 °C up to +60 °C	

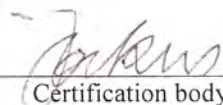
(16) Test and assessment report  
BVS PP 05.2061 EG as of 20.06.2005

(17) Special conditions for safe use  
None

We confirm the correctness of the translation from the German original.  
In the case of arbitration only the German wording shall be valid and binding.

44809 Bochum, 26.05.2008  
BVS-Schu/Ar E 0734/08

**DEKRA EXAM GmbH**

  
\_\_\_\_\_  
Certification body

  
\_\_\_\_\_  
Special services unit



Translation

# EU-Type Examination Certificate Supplement 3

Equipment intended for use in potentially explosive atmospheres  
Directive 2014/34/EU

EU-Type Examination Certificate Number: **BVS 05 ATEX E 091 X**

Product: **Force sensors type \*\*\* \*\* \* \*\* F,  
type \*\*\* \*\* \* \*\* F\*\*\*,  
type \*\*\* \*\* \* \*\* Fxx-yyzzz,  
type \*\*\* \*\* \* \*\* Fxx-yyzzz \*\*\***

Manufacturer: **Haehne Elektronische Messgeräte GmbH**

Address: **Heinrich-Hertz-Str. 29, 40699 Erkrath, Germany**

This supplementary certificate extends EC-Type Examination Certificate No. BVS 05 ATEX E 091 X to apply to products designed and constructed in accordance with the specification set out in the appendix of the said certificate but having any acceptable variations specified in the appendix to this certificate and the documents referred to therein.

DEKRA Testing and Certification GmbH, Notified Body number 0158, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products 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 No. BVS PP 05.2061 EU.



The Essential Health and Safety Requirements are assured in consideration of:

**EN IEC 60079-0:2018**                      **General requirements**  
**EN 60079-11:2012**                      **Intrinsic Safety "i"**

If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Special Conditions for Use specified in the appendix to this certificate.

This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

The marking of the product shall include the following:

	<b>II 2G Ex ia IIC T6...T1 Gb</b>	<b>type *** ** * ** Fxx-yyzzz,</b>
	<b>II 2D Ex ia IIIC T135°C Db</b>	<b>type *** ** * ** Fxx-yyzzz ***</b>
	<b>II 2G Ex ia IIC T4 Gb</b>	<b>type *** ** * ** F</b>
	<b>II 2D Ex ia IIIC T135°C Db</b>	<b>type *** ** * ** F***</b>

DEKRA Testing and Certification GmbH  
Bochum, 2020-05-11

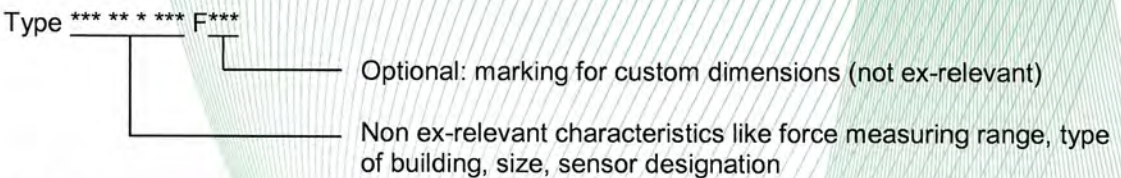
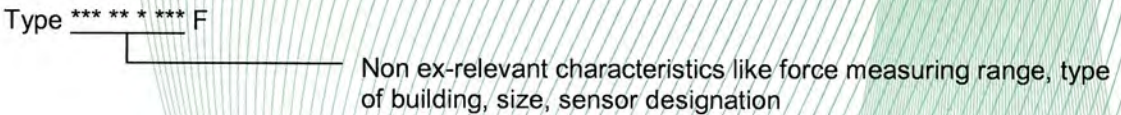
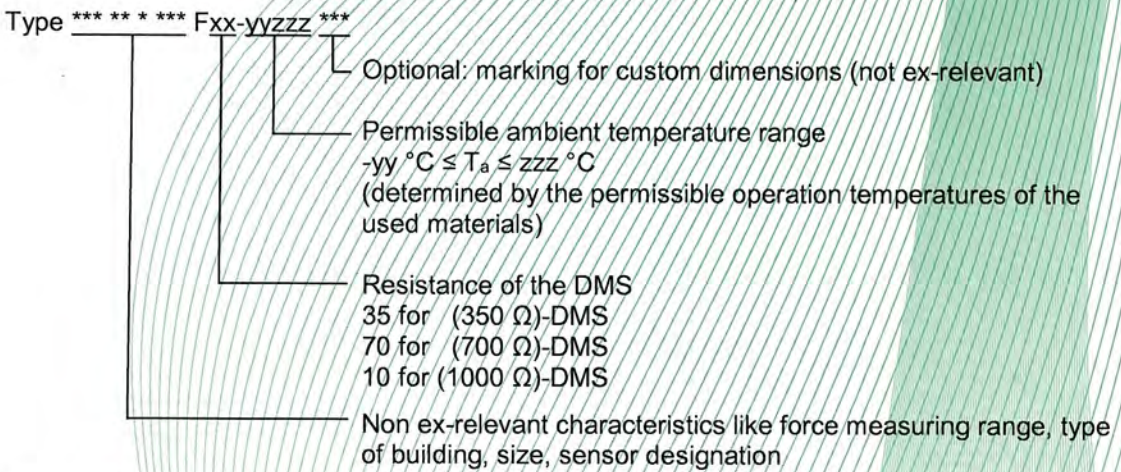
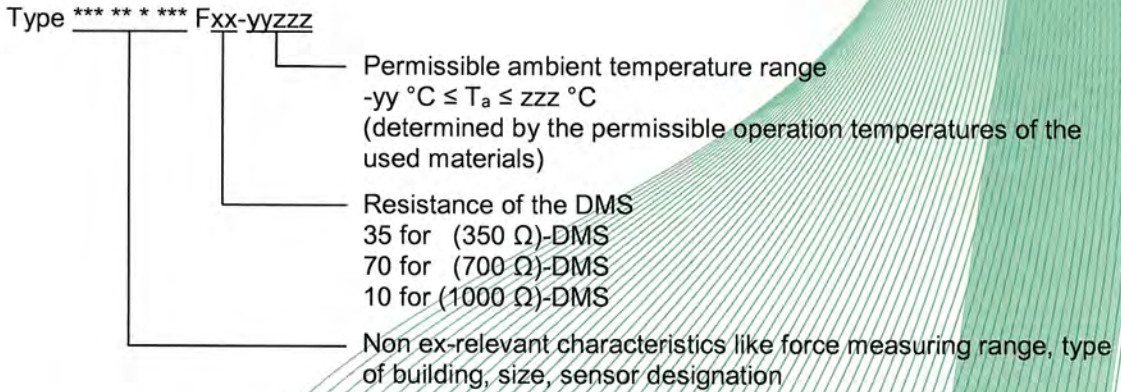
Signed: Jörg-Timm Kilisch



13 **Appendix**  
 14 **EU-Type Examination Certificate**  
**BVS 05 ATEX E 091 X**  
**Supplement 3**  
 15 **Product description**  
 15.1 **Subject and type**

Force Sensors type \*\*\* \*\* \* \*\*\* Fxx-yyzzz  
 type \*\*\* \*\* \* \*\*\* Fxx-yyzzz \*\*\*  
 type \*\*\* \*\* \* \*\*\* F  
 type \*\*\* \*\* \* \*\*\* F\*\*\*

In the complete type denomination, the wildcards are replaced by letters or numbers to indicate the different sensor variations:



Example:  
 The force sensor type \*\*\* \*\* \* \*\*\* F35-20060 has (350 Ω)-DMS and is suitable for use in a temperature range between -20 °C and +60 °C.



## 15.2 Description

The force sensors are used for the acquisition of tension and compression forces and the conversion of these forces into a proportional electrical signal.

The sensors consist of strain gauges in a bridge circuit which are glued on a metallic gauging member. The gauging member is inside a metallic sleeve.

The force sensors are simple apparatus according to clause 5.7 of EN 60079-11:2012. They are intended for use in explosive areas requiring equipment with EPL Gb resp. Db.

The electrical connection of the sensors type \*\*\* \*\* \* \*\* F and type \*\*\* \*\* \* \*\* F\*\*\* to a corresponding control unit is made with a fixed cable with max. 20 m length. The new sensor type \*\*\* \*\* \* \*\* F\*\*\* differs from the previously approved sensor type \*\*\* \*\* \* \*\* F only in the dimensions, there is no Ex-relevant technical difference.

The electrical connection of the sensors type \*\*\* \*\* \* \*\* Fxx-yyzzz and type \*\*\* \*\* \* \*\* Fxx-yyzzz \*\*\* is made with a fixed cable with variable cable length or a connection socket. The new sensor type \*\*\* \*\* \* \*\* Fxx-yyzzz \*\*\* differs from the previously approved sensor type \*\*\* \*\* \* \*\* Fxx-yyzzz only in the dimensions, there is no ex-relevant technical difference.

Depending on the type key ending "xx-yyzzz", the sensors are suitable for different ambient temperature ranges and are classified as T1...T6. For dust-applications, the sensors are marked as T135 °C.

### Reasons for the supplement

- Update of standard
- Modification of the existing type designation of the force sensor
- Introduction of new force sensor types

## 15.3 Parameters

### 15.3.1 For type \*\*\* \*\* \* \*\* Fxx-yyzzz and type \*\*\* \*\* \* \*\* Fxx-yyzzz \*\*\*

#### 15.3.1.1 Electrical parameters

Maximum input voltage	$U_i$	DC	17	V
Maximum input current for Gb-applications	$I_i$		500	mA
for Db-applications			250	mA
Maximum input power for Gb-applications	$P_i$		2	W
for Db-applications			550	mW

The force sensors do not include concentrated capacitances or inductances.

For variants with connection socket (no connected cable)

Maximum internal capacitance	$C_i$	negligible
Maximum internal inductance	$L_i$	negligible



For variants with permanently connected cable

Maximum internal capacitance  
and maximum internal inductance

are calculated only from the cable capacitance and cable inductance:

Capacitance per unit length

Inductance per unit length

$C_i$

$L_i$

160 pF/m

0.68  $\mu$ H/m

### 15.3.1.2 Ambient temperature range

Minimum ambient temperature  
depending on the type characteristic „yy“:

$T_a$

$T_{a,min}$

-yy °C

Maximum ambient temperature

depending on the type characteristics „xx“ and „zzz“ and the desired temperature class:

$T_{a,max}$

For sensors with (350  $\Omega$ )-DMS

Type characteristic xx = 35

For T1-classification

lower value of (380 °C, zzz °C)

For T2-classification

lower value of (230 °C, zzz °C)

For T3-classification

lower value of (135 °C, zzz °C)

For T4-classification

lower value of (70 °C, zzz °C)

For T5-classification

lower value of (35 °C, zzz °C)

For T6-classification

lower value of (20 °C, zzz °C)

For T135 °C-classification

lower value of (100 °C, zzz °C)

For sensors with (700  $\Omega$ )-DMS

Type characteristic xx = 70

For T1-classification

lower value of (415 °C, zzz °C)

For T2-classification

lower value of (265 °C, zzz °C)

For T3-classification

lower value of (170 °C, zzz °C)

For T4-classification

lower value of (105 °C, zzz °C)

For T5-classification

lower value of (70 °C, zzz °C)

For T6-classification

lower value of (55 °C, zzz °C)

For T135 °C-classification

lower value of (100 °C, (zzz - 10) °C)

For sensors with (1000  $\Omega$ )-DMS

Type characteristic xx = 10

For T1-classification

lower value of (405 °C, zzz °C)

For T2-classification

lower value of (255 °C, zzz °C)

For T3-classification

lower value of (160 °C, zzz °C)

For T4-classification

lower value of (95 °C, zzz °C)

For T5-classification

lower value of (60 °C, zzz °C)

For T6-classification

lower value of (45 °C, zzz °C)

For T135 °C-classification

lower value of (100 °C, zzz °C)

Example:

The materials of the force sensor type \*\*\* \*\* \* F35-20060 are suitable for use at -20 °C up to 60 °C.

For the classification of the sensor into the individual temperature classes, the upper limit of the permissible ambient temperature is calculated from the maximum temperature of the temperature class reduced by the heating of the DMS and the permissible temperature of the used materials: The force sensor is suitable for T6 in ambient temperatures -20 °C up to 20 °C. It is suitable for T5 in ambient temperatures -20 °C up to 35 °C and for T4 in ambient temperatures -20 °C up to 60 °C. For temperatures -20 °C up to 60 °C, it can be used in dust-explosive areas.

A change of the ignition behavior of the regarded gases for ambient temperatures outside atmospheric conditions (outside -20 °C up to +60 °C) has not been regarded for this certification and has to be assessed by the operator.



15.3.2 For type \*\*\* \*\* \* \*\*\* F and type \*\*\* \*\* \* \*\*\* F\*\*\*

15.3.2.1 Electrical parameters

Maximum input voltage	U <sub>i</sub>	DC	17	V
Maximum input current for Gb-applications	I <sub>i</sub>		500	mA
for Db-applications			250	mA
Maximum input power for Gb-applications	P <sub>i</sub>		2	W
for Db-applications			550	mW

The force sensors do not include concentrated capacitances or inductances.  
The internal capacitance and internal inductance are calculated only from the capacitance and inductance of the permanently connected cable (max. length 20 m):

Maximum internal capacitance	C <sub>i</sub>	3.2	nF
Maximum internal inductance	L <sub>i</sub>	14	µH

15.3.2.2 Ambient temperature range

T <sub>a</sub>	-20 °C up to +60 °C
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16 Report Number

BVS PP 05.2061 EU, as of 2020-05-11

17 Special Conditions for Use

For Use in Group III:

The intrinsically safe circuit is not safely separated from earth. Along the intrinsically safe circuit, potential equalization must exist.

The sensors have to be installed in such a way, that intensive electrostatic charging processes are excluded.

18 Essential Health and Safety Requirements

The Essential Health and Safety Requirements are covered by the standards listed under item 9.

19 Drawings and Documents

Drawings and documents are listed in the confidential report.

We confirm the correctness of the translation from the German original.  
In the case of arbitration only the German wording shall be valid and binding.

DEKRA Testing and Certification GmbH  
Bochum, 2020-05-11  
BVS-Fro/Mu A 20190861

  
\_\_\_\_\_  
Managing Director



*HAEHNE*