Translation

(1) # EC-Type Examination Certificate

(2) **- Directive 94/9/EC -**
Equipment and protective systems intended for use in potentially explosive atmospheres

(3) ## DMT 01 ATEX E 149 X

(4) **Equipment:** **Sensor type TM or TME**

(5) **Manufacturer:** **Josef Heinrichs GmbH & Co. Messtechnik KG**

(6) **Address:** **D 50739 Köln**

(7) The design and construction of this equipment and any acceptable variation thereto are specified in the schedule to this type examination certificate.

(8) The certification body of Deutsche Montan Technologie 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 01.2105 EG.

(9) The Essential Health and Safety Requirements are assured by compliance with:

EN 50014:1997+A1-A2	General requirements
EN 50020:1994	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 schedule 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 T6 - T2

Deutsche Montan Technologie GmbH

Essen, dated 14. November 2001

Signed: Jockers
DMT-Certification body

Signed: Dill
Head of special services unit

Am Technologiepark 1, 45307 Essen, Telefon (0201)172-1416, Telefax (0201)172-1716

(13) Appendix to

(14) # EC-Type Examination Certificate

DMT 01 ATEX E 149 X

(15) 15.1 Subject and type

Sensor type TM or TME

15.2 Description

The sensor in combination with a transmitter is used for flow measurement in tubes.

The sensor, which consists of magnetically excited oscillating tubes, contains as electrical components coils, resistors, temperature sensors and terminals and connectors.

The sensor can be manufactured with a connection box (mounted separately) or can be mounted close to the transmitter.

15.3 Parameters

15.3.1 Exciter circuit (terminals 9 - 10)

15.3.1.1 for type EC1

voltage	Ui		30	V
current	Ii		90	mA
power	Pi		0,4	W
effective internal capacitance	Ci		negligible	
effective internal inductance	Li		4,5	mH
max. internal inductance/resistance ratio	Li/Ri		0,15	mH/Ω

15.3.1.2 for type EC2 (the transformer is mounted separately)
for the connection of an intrinsically safe circuit type of protection EEx ia IIC with linear output characteristic and the following max. values:

voltage	Uo		30	V
current	Io		90	mA

15.3.2 Sensor circuit (terminals 1 - 2 and 3 - 4)

voltage	Ui	DC	30	V
current	Ii		50	mA
power	Pi		0,375	W
effective internal capacitance	Ci		negligible	
effective internal inductance	Li		14	mH
max. internal inductance/resistance ratio	Li/Ri		0,15	mH/Ω
output voltage	Uo	AC	0,3	V

15.3.3 Temperature sensor circuit (terminals 5 - 8)

voltage	Ui	DC	30	V
current	Ii		100	mA
power	Pi		0,333	W
effective internal capacitance	Ci		negligible	
effective internal inductance	Li		negligible	

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15.3.4 Ambient temperature range Ta
depending on type, installation, process temperature and temperature class:

15.3.4.1 separately mounted

type	distance element	process temperature (°C)	ambient temperature range (°C)	temperature class
TM/TME	without	48	-40 up to +48	T6
TM/TME	without	60	-40 up to +60	T5
TM/TME	without	100	-40 up to +60	T4
TM/TME	100 mm	120	-40 up to +60	T4
TM/TME	100 mm	180	-40 up to +60	T3
TM	200 mm	260	-40 up to +60	T2

15.3.4.2 mounted close to the transmitter

Typ	distance element	process temperature (°C)	ambient temperature range (°C)	temperature class
TM/TME	without	48	-40 up to +48	T6
TM/TME	without	60	-40 up to +55	T5
TM/TME	without	100	-40 up to +50	T4
TM/TME	100 mm	120	-40 up to +50	T4
TM/TME	100 mm	150	-40 up to +50	T3

The values for ambient temperature mentioned in the certificate of the transformer have to be regarded.

(16) Test and assessment report
BVS PP 01.2105 EG as of 14.11.2001

(17) Special conditions for safe use

17.1 If the sensor is mounted separately the equipotential bonding between the transmitter and the sensor has to be made.

17.2 For the application of the sensor in an ambient temperature of less than - 20 °C suitable cables and cable entries suitable for this condition shall be used.

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.

45307 Essen, 14.11.2001
BVS-Schu/Mi A 20010237

Deutsche Montan Technologie GmbH

DMT-Certification body

Head of special services unit

Am Technologiepark 1, 45307 Essen, Telefon (0201)172-1416, Telefax (0201)172-1716

Translation

1st Supplement

(Supplement in accordance with Directive 94/9/EC Annex III number 6)

to the EC-Type Examination Certificate
DMT 01 ATEX E 149 X

Equipment: **Mass flow sensor type TM or TME**

Manufacturer: **Heinrichs Messtechnik GmbH**

former Josef Heinrichs GmbH & Co. Messtechnik KG

Address: **D - 50739 Köln**

Description

The flow sensor may be used in such a way that in the measuring tubes explosive atmosphere may be present often or for a long time, marking

⟨Ex⟩ II 1/2 G EEx ia IIC T6 – T2

The Essential Health and Safety Requirements of the modified equipment are assured by compliance with:

EN 50014:1997+A1-A2	General requirements
EN 50020:2002	Intrinsic safety 'i'
EN 50284:1999	Equipment Group II Category 1G

Test and assessment report

BVS PP 01.2105 EG as of 26.08.2003

Special conditions for safe use

1 If the sensor is mounted separately; the equipotential bonding between the transmitter and the sensor has to be done.

2 For the application of the sensor in an ambient temperature of less than - 20 °C suitable cables and cable entries suitable for this condition shall be used.

3 The measuring tubes built of corrosion-resistant steel have a thickness of < 1 mm: For the use it must be sure that risks e.g. by the medium or mechanical damages are excluded.

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(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen)

DMT

Deutsche Montan Technologie GmbH
Bochum, dated 26. August 2003

signed: Migenda	signed: Leiendecker
EXAM Certification body	Special services unit

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, 26.08.2003
BVS-Schu/Ar A 20030614

Deutsche Montan Technologie GmbH

EXAM Certification body	Special services unit

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(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen)

EXAM
BBG Prüf- und Zertifizier GmbH

Translation

2nd Supplement

(Supplement in accordance with Directive 94/9/EC Annex III number 6)

to the EC-Type Examination Certificate
DMT 01 ATEX E 149 X

Equipment: **Mass flow sensor type TM or TME**

Manufacturer: **Heinrichs Messtechnik GmbH**

Address: **D - 50739 Köln**

Description
The sensor can be modified according to the descriptive documents as mentioned in the pertinent test and assessment report and gets the denomination

type TMU

The Essential Health and Safety Requirements of the modified equipment are assured by compliance with:

EN 50014:1997+A1-A2	General requirements
EN 50020:2002	Intrinsic safety 'i'
EN 50284:1999	Equipment Group II Category 1G

Test and assessment report
BVS PP 01.2105 EG as of 05.11.2004

EXAM BBG Prüf- und Zertifizier GmbH
Bochum, dated 05. November 2004

Signed: Dr. Jockers
Certification body

Signed: Dr. Eickhoff
Special services unit

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(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen)

BBG Prüf- und Zertifizier GmbH

Translation

3rd Supplement

(Supplement in accordance with Directive 94/9/EC Annex III number 6)

to the EC-Type Examination Certificate
DMT 01 ATEX E 149 X

Equipment: **Mass flow sensor type TM, TME, TMU or TMR**

Manufacturer: **Heinrichs Messtechnik GmbH**

Address: **50739 Cologne, Germany**

Description
The sensor can be modified according to the descriptive documents as mentioned in the pertinent test and assessment report.
The types TM, TME and TMU can be used in an ambient temperature range up to +100 °C in temperature classes T2, T3 and T4.
A new sensor is also available:

Type TMR

The Essential Health and Safety Requirements of the modified equipment are assured by compliance with:

EN 50014:1997+A1-A2	General requirements
EN 50020:2002	Intrinsic safety 'i'
EN 50284:1999	Equipment Group II Category 1G

The marking of the equipment shall include the following:

II 1/2G EEx ia IIC T6 – T2

Parameters

1 Type TMR
1.1 Exciter circuit (terminals/connector pin 9 - 10)
1.1.1 for type EC1

voltage	Ui	30	V
current	Ii	90	mA
power	Pi	0,4	W
effective internal capacitance	Ci	negligible	
effective internal inductance	Li	4,5	mH
max. internal inductance/resistance ratio	Li/Ri	0,1	mH/Ω

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1.1.2 for type EC2 (the transformer is mounted separately)
for the connection of an intrinsically safe circuit type of protection EEx ia IIC with linear output characteristic and the following max. values:

voltage	Uo		30	V
current	Io		90	mA
power	Po		1	W

1.2 Sensor circuit (terminals/connector pin 1 - 2 and 3 - 4)

voltage	Ui	DC	30	V
current	Ii		50	mA
power	Pi		0,4	W
effective internal capacitance	Ci	negligible		
effective internal inductance	Li		14	mH
max. internal inductance/resistance ratio	Li/Ri		0,17	mH/Ω
output voltage	Uo	AC	0,3	V

1.3 Temperature sensor circuit (terminals/connector pin 5 - 8)

voltage	Ui	DC	30	V
current	Ii		100	mA
power	Pi		0,333	
	W			
effective internal capacitance	Ci	negligible		
effective internal inductance	Li	negligible		

4.2 For types TM, TME, TMU and TMR
Ambient temperature range Ta
depending on the type, the installation, the process temperature and the temperature class:

4.2.1 with connector

distance element	process temperature (°C)	ambient temperature range (°C)	temperature class
without	+45	-40 bis +45	T6
without	+60	-40 bis +60	T5
60 mm	+100	-40 bis +100	T4
160 mm	+120	-40 bis +100	T4
160 mm	+180	-40 bis +100	T3
260 mm	+260	-40 bis +100	T2

4.2.2 removed mounted

distance element	process temperature (°C)	ambient temperature range (°C)	temperature class
without	+45	-40 bis +45	T6
without	+60	-40 bis +60	T5
without	+100	-40 bis +100	T4
100 mm	+120	-40 bis +100	T4
100 mm	+180	-40 bis +100	T3
200 mm	+260	-40 bis +100	T2

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4.2.3 mounted close to the transmitter

distance element	process temperature (°C)	ambient temperature range (°C)	temperature class
without	+45	+45	T6
without	+60	+55	T5
without	+100	+50	T4
100 mm	+120	+50	T4
100 mm	+150	+50	T3

The values for ambient temperature mentioned in the certificate of the transformer have to be regarded.

Special conditions for safe use

1 If the sensor is mounted separately; the equipotential bonding between the transmitter and the sensor has to be done.

2 For the application of the sensor in an ambient temperature of less than -20 °C and higher than +60 °C suitable cables and cable entries suitable for this condition shall be used.

3 The measuring tubes built of corrosion-resistant steel have a thickness of < 1 mm: For the use it must be sure that risks e.g. by the medium or mechanical damages are excluded.

Test and assessment report
BVS PP 01.2105 EG as of 30.11.2006

EXAM BBG Prüf- und Zertifizier GmbH
Bochum, dated 30. November 2006

Signed: Dr. Jockers
Certification body

Signed: Dr. Eickhoff
Special services unit

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, 30. November 2006
BVS-Schu/Kw A 20060792

EXAM BBG Prüf- und Zertifizier GmbH

Certification body

Special services unit

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(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen Germany)

DEKRA

Translation

4th Supplement

(Supplement in accordance with Directive 94/9/EC Annex III number 6)

to the EC-Type Examination Certificate
DMT 01 ATEX E 149 X

Equipment: **Mass flow sensor type TM, TME, TMU, TMR resp. TMS**

Manufacturer: **Heinrichs Messtechnik GmbH**

Address: **50739 Cologne, Germany**

Description
The types TM, TME, TMU and TMR have been evaluated in accordance with the standards EN 60079-* and a new variation is available:
Type TMS

The Essential Health and Safety Requirements of the modified equipment are assured by compliance with:

EN 60079-0:2006 General requirements
EN 60079-11:2007 Intrinsic safety 'i'
EN 60079-26:2004 Equipment Group II Category 1G

The marking of the equipment shall include the following:

II 1/2G Ex ia IIC T6-T2

Parameters

1 Types TM, TME, TMU and TMR
not changed

2 Type TMS

2.1 Exciter circuit (contacts 1 - 2)

Voltage	Ui	30	V
Current for Group IIC Classification	Ii	130	mA
Current for Group IIB Classification	Ii	280	mA
Power	Pi	0.5	W
Internal capacitance	Ci	negligible	
Internal inductance	Li	2	mH

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(until 31.05 2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen Germany)

2.2	Sensor circuit (contacts 5 - 6 and 7 - 8)				
	Voltage	Ui	DC	30	V
	Current for Group IIC Classification	Ii		50	mA
	Current for Group IIB Classification	Ii		100	mA
	Power	Pi		0.4	W
	Internal capacitance	Ci		negligible	
	Internal inductance	Li		14	mH
	Output voltage	Uo	AC	0.3	V
2.3	Temperature sensor circuit (contacts 3 - 4)				
	Voltage	Ui	DC	30	V
	Current	Ii		100	mA
	Power	Pi		0.1	W
	Internal capacitance	Ci		negligible	
	Internal inductance	Li		negligible	

2.4 Ambient temperature range Ta

Depending on the process temperature and the temperature class:

Process temperature -50 °C up to (°C)	Ambient temperature range (°C)	Temperature class
125	-40 up to +60	T4
70	-40 up to +60	T5

Special conditions for safe use

1 If the sensor is mounted separately; the equipotential bonding between the transmitter and the sensor has to be done.

2 For the application of the sensor in an ambient temperature of less than - 20 °C and higher than +60 °C suitable cables and cable entries suitable for this condition shall be used.

3 The measuring tubes built of corrosion-resistant steel have a thickness of < 1 mm. For the use it must be sure that risks e.g. by the medium or mechanical damages are excluded.

Test and assessment report
BVS PP 01.2105 EG as of 14.02.2008

DEKRA EXAM GmbH
Bochum, dated 14. February 2008

Signed: Dr. Jockers
Certification body

Signed: Dr. Eickhoff
Special services unit

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(until 31.05 2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen Germany)

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, 14.02.2008
BVS-Schu/Wa A 20080042

DEKRA EXAM GmbH

Certification body

Special services unit

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(until 31.05 2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen Germany)

DEKRA

Translation

5th Supplement

(Supplement in accordance with Directive 94/9/EC Annex III number 6)

to the EC-Type Examination Certificate
DMT 01 ATEX E 149 X

Equipment: **Mass flow sensor type TM, TME, TMU, TMR resp. TMS**

Manufacturer: **Heinrichs Messtechnik GmbH**

Address: **50739 Köln, Germany**

Description

The flow sensors can be modified according to the descriptive documents as mentioned in the pertinent test and assessment report; the type TMS will be modified and the following variations are possible:

Type TMS with Exiter circuit EC1 resp.
Type TMS with Exiter circuit EC2

The Essential Health and Safety Requirements of the modified equipment are assured by compliance with:

EN 60079-0:2006 General requirements
EN 60079-11:2007 Intrinsic safety 'i'
EN 60079-26:2004 Equipment Group II Category 1G

The marking of the equipment shall include the following:

Ex II 1/2G Ex ia IIC T6-T2

Parameters

1 Types TM, TME, TMU and TMR
not changed

2 Type TMS

2.1 Exciter circuit (contacts 1 - 2)

2.1.1 Circuit EC1

Voltage	Ui	30 V
Current for Group IIC Classification	Ii	130 mA
Current for Group IIB Classification	Ii	280 mA
Power	Pi	0.5 W
Internal capacitance	Ci	negligible
Internal inductance	Li	2 mH

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(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen Germany

2.1.2 Circuit EC2 (the transmitter is mounted separately)
For the connection of an intrinsically safe circuit level of protection Ex ia and the following maximum values:

Voltage	Uo		30	V
Current for Group IIC Classification	Io		130	mA
Current for Group IIB Classification	Io		280	mA
Power	Po		0.5	W

2.2 Sensor circuit (contacts 5 - 6 and 7 - 8)

Voltage	Ui	DC	30	V
Current for Group IIC Classification	Ii		50	mA
Current for Group IIB Classification	Ii		100	mA
Power	Pi		0.4	W
Internal capacitance	Ci		negligible	
Internal inductance	Li		14	mH
Output voltage	Uo	AC	0.3	V

2.3 Temperature sensor circuit (contacts 3 - 4)

Voltage	Ui	DC	30	V
Current	Ii		100	mA
Power	Pi		0.1	W
Internal capacitance	Ci		negligible	
Internal inductance	Li		negligible	

2.4 Ambient temperature range Ta
depending on the process temperature and the temperature class:

Process temperature -50 °C up to (°C)	Ambient temperature range (°C)	Temperature class
125	-40 up to +60	T4
70	-40 up to +60	T5

Special conditions for safe use

1 If the sensor is mounted separately; the equipotential bonding between the transmitter and the sensor has to be done.

2 For the application of the sensor in an ambient temperature of less than - 20 °C and higher than +60 °C suitable cables and cable entries suitable for this condition shall be used.

3 The measuring tubes built of corrosion-resistant steel have a thickness of < 1 mm: For the use it must be sure that risks e.g. by the medium or mechanical damages are excluded.

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(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen Germany

Test and assessment report

BVS PP 01.2105 EG as of 09.09.2010

DEKRA EXAM GmbH
Bochum, dated 09th September 2010

Signed:Hans Christian Simanski	Signed: Dr. Franz Eickhoff
Certification body	Special services unit

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, 09.09.2010
BVS-Schu/Ar A 20100643

DEKRA EXAM GmbH

Certification body	Special services unit

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(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen Germany

Translation

(1) # 6. Supplement to the EC-Type Examination Certificate

(2) Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC
Supplement accordant with Annex III number 6

(3) No. of EC-Type Examination Certificate: **DMT 01 ATEX E 149 X**

(4) Equipment: **Mass flow sensor type TM, TME, TMU, TMR resp. TMS**

(5) Manufacturer: **Heinrichs Messtechnik GmbH**

(6) Address: **Robert-Perthel-Straße 9, 50739 Köln, Germany**

(7) The design and construction of this equipment and any acceptable variation thereto are specified in the appendix to this supplement.

(8) The certification body of DEKRA EXAM 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 01.2105 EG.

(9) The Essential Health and Safety Requirements are assured by compliance with:

EN 60079-0:2012	**General requirements**
EN 60079-11:2012	**Intrinsic safety 'i'**
EN 60079-26:2007 + Corr. 2009	**Equipment with equipment protection level (EPL) Ga**

(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 supplement to the 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 1/2G Ex ia IIC T6 – T2 Ga/Gb resp.
II 1/2G Ex ia IIC T5 / T4 Ga/Gb (type TMS)

DEKRA EXAM GmbH
Bochum, dated 22nd May 2013

Signed: Hans-Christian Simanski
Certification body

Signed: Franz Eickhoff
Special services unit

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(13) Appendix to

(14) **6. Supplement to the EC-Type Examination Certificate DMT 01 ATEX E 149 X**

(15) 15.1 Subject and type

Mass flow sensor type TM, TME, TMU, TMR resp. TMS

15.2 Description

The mass flow sensors can be modified according to the descriptive documents as mentioned in the pertinent Test and Assessment Report. The sensors have been evaluated in acc. with the current standard versions, a modified marking is the result.

15.3 Parameters

15.3.1 Type TM resp. TME resp. TMU resp. TMR

15.3.1.1 Exciter circuit (terminals 9 - 10)

15.3.1.1.1 For type EC1

Voltage	U_i	30	V
Current	I_i	90	mA
Power	P_i	0,4	W
Effective internal capacitance	C_i	negligible	
Effective internal inductance	L_i	4,5	mH

15.3.1.1.2 For type EC2 (the transformer is mounted separately)
For the connection of an intrinsically safe circuit type of protection Ex ia IIC with linear output characteristic and the following max. values:

Voltage	U_o	30	V
Current	I_o	90	mA
Power	P_o	1	W

15.3.1.2 Sensor circuit (terminals 1 - 2 and 3 - 4)

Voltage	U_i	DC 30	V
Current	I_i	50	mA
Power	P_i	0.375	W
Effective internal capacitance	C_i	negligible	
Effective internal inductance	L_i	14	mH
Output voltage	U_o	AC 0.3	V

15.3.1.3 Temperature sensor circuit (terminals 5 - 8)

Voltage	U_i	DC 30	V
Current	I_i	100	mA
Power	P_i	0.333	W
Effective internal capacitance	C_i	negligible	
Effective internal inductance	L_i	negligible	

15.3.2 Type TMS

15.3.2.1 Exciter circuit (contacts 1 - 2)
Circuit EC1

Voltage	U_i	30	V
Current for Group IIC Classification	I_i	130	mA
Current for Group IIB Classification	I_i	280	mA
Power	P_i	0.5	W
Effective internal capacitance	C_i	negligible	
Effective internal inductance	L_i	2	mH

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15.3.2.1.2 Circuit EC2 (the transmitter is mounted separately)
For the connection of an intrinsically safe circuit level of protection Ex ia with the following maximum values:

Voltage	U_o	30	V
Current for Group IIC Classification	I_o	130	mA
Current for Group IIB Classification	I_o	280	mA
Power	P_o	0.5	W

15.3.2.2 Sensor circuit (contacts 5 - 6 and 7 - 8)

Voltage	U_i	DC 30	V
Current for Group IIC Classification	I_i	50	mA
Current for Group IIB Classification	I_i	100	mA
Power	P_i	0.4	W
Effective internal capacitance	C_i	negligible	
Effective internal inductance	L_i	14	mH
Output voltage	U_o	AC 0.3	V

15.3.2.3 Temperature sensor circuit (contacts 3 - 4)

Voltage	U_i	DC 30	V
Current	I_i	100	mA
Power	P_i	0.1	W
Effective internal capacitance	C_i	negligible	
Effective internal inductance	L_i	negligible	

15.3.3 Ambient temperature range T_a
depending on the type, the installation, the process temperature and the temperature class:

15.3.3.1 for types TM, TME, TMU and TMR
15.3.3.1.1 with connector

distance element	process temperature (°C)	ambient temperature range (°C)	temperature class
without	45	-40 up to +45	T6
without	60	-40 up to +60	T5
60 mm	100	-40 up to +100	T4
160 mm	120	-40 up to +100	T4
160 mm	180	-40 up to +100	T3
260 mm	260	-40 up to +100	T2

15.3.3.1.2 removed mounted

distance element	process temperature (°C)	ambient temperature range (°C)	temperature class
without	45	-40 up to +45	T6
without	60	-40 up to +60	T5
without	100	-40 up to +100	T4
100 mm	120	-40 up to +100	T4
100 mm	180	-40 up to +100	T3
200 mm	260	-40 up to +100	T2

15.3.3.1.3 mounted close to the transmitter

distance element	process temperature (°C)	Max. ambient temperature (°C)	temperature class
without	45	+45	T6
without	60	+55	T5
without	100	+50	T4
100 mm	120	+50	T4
100 mm	150	+50	T3

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The values for ambient temperature mentioned in the certificate of the transformer have to be regarded.

15.3.3.2 for type TMS T_a

Process temperature -50 °C up to (°C)	Ambient temperature range (°C)	Temperature class
125	-40 up to +60	T4
70	-40 up to +60	T5

(16) Test and Assessment Report

BVS PP 01.2105 EG as of 22.05.2013

(17) Special conditions for safe use

17.1 If the sensor is mounted separately; the equipotential bonding between the transmitter and the sensor has to be done.

17.2 For the application of the sensor in an ambient temperature of less than -20 °C and higher than +60 °C suitable cables and cable entries suitable for this condition shall be used.

17.3 The measuring tubes built of corrosion-resistant steel have a thickness of < 1 mm: For the use it must be sure that risks e.g. by the medium or mechanical damages are excluded.

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 EXAM GmbH
44809 Bochum, 22nd May 2013
BVS-Schu/Mu A 20130268

Certification body

Special services unit

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Translation

1 EU-Type Examination Certificate Supplement 7

Change to Directive 2014/34/EU

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

3 EU-Type Examination Certificate Number: **DMT 01 ATEX E 149 X**

4 Product: **Mass flow sensor TM families**

5 Manufacturer: **Heinrichs Messtechnik GmbH**

6 Address: **Robert-Perthel-Straße 9, 50739 Köln, Germany**

7 This supplementary certificate extends EC-Type Examination Certificate No. DMT 01 ATEX E 149 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.

8 DEKRA EXAM 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 01.2105 EU.

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

EN 60079-0:2012 + A11:2013	**General requirements**
EN 60079-11:2012	**Intrinsic Safety "i"**
EN 60079-26:2015	**Equipment with equipment protection level (EPL) Ga**

10 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.

11 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.

12 The marking of the product shall include the following:

II 1/2G Ex ia IIC T2...T6 Ga/Gb See tables section 15 for details

DEKRA EXAM GmbH
Bochum, 2018-11-07

Signed: Jörg Koch
Certifier

Signed: Deniz Pezzutto
Approver

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13 **Appendix**

14 **EU-Type Examination Certificate**

DMT 01 ATEX E 149 X
Supplement 7

15 **Product description**

15.1 **Subject and type**

Mass flow sensor TM families

Type TM-ABC-DEFGHIJK-LMNO-P-Q-R-S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V

A Wetted Material
\- Not relevant

B C Flow-rate Range
\- \- Not relevant

D E F G Process connection
\- \- \- \- Not relevant

H I J K Installation length
\- \- \- \- Not relevant

L Enclosure options
\- Not relevant

M Heating / Cooling
\- Not relevant

N Flow direction
\- Not relevant

O Sensor Configurations
1 Mounted transmitter -20 °C to 100 °C
2 Mounted transmitter -20 °C to 150 °C
3 Remote transmitter (M20x1.5) -40 °C to 100 °C
4 Remote transmitter (M20x1.5) -40 °C to 180 °C
5 Remote transmitter (M20x1.5) -40 °C to 260 °C
6 Remote transmitter (1/2" NPT) -40 °C to 100 °C
7 Remote transmitter (1/2" NPT) -40 °C to 180 °C
8 Remote transmitter (1/2" NPT) -40 °C to 260 °C

P Approvals
L ATEX / IECEx – Supplement 7 onwards

Q Certificates
\- Not relevant

R Supplementary equipment
\- Not relevant

S T U V Additional options
\- \- \- \- Not relevant

Type TME-ABC-DEFGHIJ-K-L-M-N

A	B	C	D	E	F	G	H	I	J	K	L	M	N

A Wetted Material
\- Not relevant

B C Flow-rate Range
\- \- Not relevant

D E F G Process connection
\- \- \- \- Not relevant

H Heating / Cooling
\- Not relevant

I Flow direction
\- Not relevant

J Sensor Configurations
1 Mounted transmitter -20 °C to 100 °C
2 Mounted transmitter -20 °C to 150 °C
3 Remote transmitter (M20x1.5) -40 °C to 100 °C
4 Remote transmitter (M20x1.5) -40 °C to 180 °C
6 Remote transmitter (1/2" NPT) -40 °C to 100 °C
7 Remote transmitter (1/2" NPT) -40 °C to 180 °C

K Approvals
L ATEX / IECEx – Supplement 7 onwards

L Certificates
\- Not relevant

M Supplementary equipment
\- Not relevant

N Design
\- Not relevant

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Type TMR-ABC-DEFGHIJK-LMNO-P-Q-R

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R

A Wetted Material
- Not relevant

B C Flow-rate Range
- - Not relevant

D E F G Process connection
- - - - Not relevant

H I J K Installation length
- - - - Not relevant

L Enclosure options
- Not relevant

M Heating / Cooling
- Not relevant

N Flow direction
- Not relevant

O Sensor Configurations
1 Mounted transmitter -20 °C to 100 °C
2 Mounted transmitter -20 °C to 150 °C
3 Remote transmitter (M20x1.5) -40 °C to 100 °C
4 Remote transmitter (M20x1.5) -40 °C to 180 °C
5 Remote transmitter (M20x1.5) -40 °C to 260 °C
6 Remote transmitter (1/2" NPT) -40 °C to 100 °C
7 Remote transmitter (1/2" NPT) -40 °C to 180 °C
8 Remote transmitter (1/2" NPT) -40 °C to 260 °C

P Approvals
L ATEX / IECEx – Supplement 7 onwards

Q Certificates
- Not relevant

R Supplementary equipment
- Not relevant

Type TM-SH-ABCD-EFGH-IJK-LM-NO-P-Q

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q

A B Model / Range
- - Not relevant

C D Wetted Material
- - Not relevant

E F G H Process connection
- - - - Not relevant

I Enclosure options
- Not relevant

J Enclosure Filling
- Not relevant

K Heating / Cooling
- Not relevant

L Sensor Configurations
K Remote transmitter -40 °C to 60 °C - connection via HAN R23 connecto
L Remote transmitter -40 °C to 100 °C - connection via HAN R23 connecto
X Customer specified - connection via HAN R23 connector

M Approvals
L ATEX / IECEx – Supplement 7 onwards

N Calibration Flow
- Not relevant

O Calibration Density
- Not relevant

P Supplementary equipment
- Not relevant

Q Design
- Not relevant

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Type TMU-ABCD-EFGH-IJK-LM-NO-P-Q

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q

A Wetted Material
- Not relevant

B C D Model size
- - - Not relevant

E F G H Process connection
- - - - Not relevant

I Enclosure options
- Not relevant

J Heating / Cooling
- Not relevant

K Heating / Cooling connections
- Not relevant

L Sensor Configurations
- A Mounted transmitter -20 °C to 100 °C
- B Mounted transmitter -20 °C to 150 °C
- C Remote transmitter (1/2" NPT) -40 °C to 100 °C
- D Remote transmitter (1/2" NPT) -40 °C to 180 °C
- E Remote transmitter (1/2" NPT) -40 °C to 260 °C
- F Remote transmitter (M20x1.5) -40 °C to 100 °C
- G Remote transmitter (M20x1.5) -40 °C to 180 °C
- H Remote transmitter (M20x1.5) -40 °C to 260 °C
- K Remote transmitter -40 °C to 100 °C - connection via HAN R23 connector
- L Remote transmitter -40 °C to 180 °C - connection via HAN R23 connector
- M Remote transmitter -40 °C to 260 °C - connection via HAN R23 connector
- X Customer specified

M Approvals
- L ATEX / IECEx – Supplement 7 onwards

N Calibration Flow
- Not relevant

O Calibration Density
- Not relevant

P Supplementary equipment
- Not relevant

Q Design
- Not relevant

Type TMS-ABCD-EFGH-IJK-LM-NO-P

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P

A Wetted Material
- Not relevant

B C D Model size
- - - Not relevant

E F G H Process connection
- - - - Not relevant

I Enclosure options
- Not relevant

J Heating / Cooling
- Not relevant

K Heating / Cooling connections
- Not relevant

L Sensor Configurations
- J Remote transmitter (M20x1.5) -50 °C to 125 °C

M Approvals
- A ATEX / IECEx

N Calibration Flow
- Not relevant

O Calibration Density
- Not relevant

P Supplementary equipment
- Not relevant

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15.2 **Description**

With this supplement the certificate is changed to Directive 2014/34/EU.
(Annotation: In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Supplementary Certificates to such EC-Type Examination Certificates, and new issues of such certificates, may continue to bear the original certificate number issued prior to 20 April 2016.)

Subject of the supplement

- Change to Directive 2014/34/EU
- Introduction of new type sensors: TM-***-********-****-L-*-*-* resp. TME-***-*******-L-*-*-* resp. TMU-****-****-***-*L-**-*-* resp. TMR-***-********-****-L-*-* resp. TM-SH-****-****-***-*L-**-*-*
- Adjustment of the electrical parameters for the new sensors
- Modifications of the junction box, the connection board and the limiter circuitry
- Introduction of a new set of printed circuit boards for coil mounting in the type TM-SH-****-****-***-*L-**-*-*.
- Extension by alternative designs with amendments to the excitation circuit and temperature sensor.
- The sensor types TM, TME, TMU and TMR approved with the EC-Type Examination Certificate DMT 01 ATEX E 149 X Supplement 6, shall no longer be produced, and are therefore no longer available for delivery.
- The type TMS-****-****-***-*A-**-* remains unchanged.

Description of Product:

The Coriolis sensors are used in combination with a transmitter for mass-flow measurement in pipes. The mass flow sensors consisting of magnetically excited vibrating tubes, contains the electrical components, coils, resistors, temperature sensors as well as terminals and connectors for connection to the associated transmitter. The transmitter can be mounted directly on the sensor or separately connected by a cable.

The design of the sensor system is variable. The sensors can be adapted to different plant and process conditions by using a variety of materials and process connections. The Coriolis sensor can be used in applications where an explosive atmosphere can be present in the measuring tubes frequently or over a longer period of time.

The following variations of the sensor are possible:
Type TM-***-********-****-L-*-*-*
Type TME-***-*******-L-*-*-*
Type TMU-****-****-***-*L-**-*-*
Type TMR-***-********-****-L-*-*
Type TM-SH-****-****-***-*L-**-*-*
Type TMS-****-****-***-*A-**-*

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15.3 **Parameters**

15.3.1 Type TM-***-********-****-L-*-*-* resp. type TME-***-*******-L-*-*-* resp. type TMU-****-****-***-*L-**-*-* resp. type TMR-***-********-****-L-*-* resp. type TM-SH-****-****-***-*L-**-*-*

15.3.1.1 Exciter circuit

For exciter circuit type EC1 (terminals 9 - 10) or exciter circuit type EC1R (terminals 8 - 9)

Voltage	U_i		30 V
Current	I_i		90 mA
Power	P_i		0.4 W
Effective internal capacitance	C_i		negligible
Effective internal inductance	L_i		4.38 mH

For exciter circuit type EC2 (terminals 9 - 10) or exciter circuit type EC2R (terminals 8 - 9)
For the connection of an intrinsically safe circuit type of protection Ex ia IIC with linear output characteristic and the following max. values:

Voltage	U_o		30 V
Current	I_o		90 mA
Power	P_o		0.8 W

15.3.1.2 Sensor circuit (terminals 1 - 2 and 3 - 4)

Voltage	U_i	DC	30 V
Current	I_i		50 mA
Power	P_i		0.3 W
Effective internal capacitance	C_i		negligible
Effective internal inductance	L_i		14 mH
Output voltage	U_o	AC	0.3 V

15.3.1.3 Temperature sensor circuit (terminals 5 - 8 for type EC1 or type EC2; terminals 5 - 7 for type EC1R or type EC2R)

Voltage	U_i	DC	30 V
Current	I_i		100 mA
Power	P_i		0.1 W

15.3.2 Type TMS-****-****-***-*A-**-*

15.3.2.1 Exciter circuit (contacts 1 - 2)

Exciter circuit EC1

Voltage	U_i		30 V
Current for Group IIC Classification	Ii		130 mA
Current for Group IIB Classification	Ii		280 mA
Power	P_i		0.5 W
Effective internal capacitance	C_i		negligible
Effective internal inductance	L_i		2 mH

Exciter circuit EC2 (the transmitter is mounted separately)
For the connection of an intrinsically safe circuit level of protection Ex ia with the following maximum values:

Voltage	U_o		30 V
Current for Group IIC Classification	I_o		130 mA
Current for Group IIB Classification	I_o		280 mA
Power	P_o		0.5 W

15.3.2.2 Sensor circuit (contacts 5 - 6 and 7 - 8)

Voltage	U_i	DC	30 V
Current for Group IIC Classification	I_i		50 mA
Current for Group IIB Classification	I_i		100 mA
Power	P_i		0.4 W
Effective internal capacitance	C_i		negligible
Effective internal inductance	L_i		14 mH
Output voltage	U_o	AC	0.3 V

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15.3.2.3 Temperature sensor circuit (contacts 3 - 4)

Voltage	U_i	DC 30	V
Current	I_i	100	mA
Power	P_i	0.1	W

15.3.3 Ambient temperature range Ta
depending on the type of electrical connection, the installation, the process temperature and the temperature class:

15.3.3.1 For type TM-***-********-****-L-*-*-* resp. type TME-***-*******-L-*-*-* resp. type TMU-****-****-***-*L-**-*-* resp. type TMR-***-********-****-L-*-* resp. type TM-SH-****-****-***-*L-**-*-*

15.3.3.1.1 Mounted separately with a HAN R23 connector

Neck extension element	Process temperature (°C)	Ambient temperature range (°C)	Temperature class
without	45	-40 up to +45	T6
without	60	-40 up to +60	T5
without	100	-40 up to +60	T4
60 mm	100	-40 up to +80	T4
160 mm	120	-40 up to +80	T4
160 mm	180	-40 up to +80	T3
260 mm	260	-40 up to +80	T2

TM-SH sensors are restricted to T_{Amb} = 60 °C and $T_{Process}$ = 100 °C

15.3.3.1.2 Mounted separately with a junction box

Neck extension element	Process temperature (°C)	Ambient temperature range (°C)	Temperature class
without	45	-40 up to +45	T6
without	60	-40 up to +60	T5
without	100	-40 up to +80	T4
100 mm	120	-40 up to +80	T4
100 mm	180	-40 up to +80	T3
200 mm	260	-40 up to +80	T2

15.3.3.1.3 Mounted to the transmitter

Neck extension element	Process temperature (°C)	Max. ambient temperature (°C)	Temperature class
without	45	+45	T6
without	60	+55	T5
without	100	+50	T4
100 mm	120	+50	T4
100 mm	150	+50	T3

The values for ambient temperature mentioned in the certificate of the transformer have to be regarded.

15.3.3.2 For type TMS-****-****-***-*A-**-*

Process temperature -50 °C up to (°C)	Ambient temperature range (°C)	Temperature class
125	-40 up to +60	T4
70	-40 up to +60	T5

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16 **Report Number**

BVS PP 01.2105 EU, as of 07.11.2018

17 **Special Conditions for Use**

17.1 If the sensor is mounted separately from the transmitter, equipotential bonding between the transmitter and the sensor must be guaranteed.

17.2 For the application of the sensor in an ambient temperature of less than -20 °C and higher than +60 °C cables and cable entries suitable for this condition shall be used.

17.3 The measuring tubes built of corrosion-resistant steel may have a thickness of < 1 mm. During installation and operation it must be ensured that risks e.g. by the medium or by mechanical damages 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 EXAM GmbH
Bochum, dated 2018-11-07
BVS-Fro/Ben/Mu A 20170496

Certifier Approver

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