Translation

(1) EC-Type Examination Certificate

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

(3) No. of EC-Type Examination Certificate: **BVS 13 ATEX E 061**

(4) Equipment: **Flow Meter type MAGIN-Ex®**

(5) Manufacturer: **Grünewald GmbH**

(6) Address: **Oberallener Weg 7, 59069 Hamm, 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 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 13.2119 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"

(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 Ex ia IIA T4 Gb	(compact versions without
I M1 Ex ia I Ma	CAN bus or RS485 interface)
II 2G Ex ia [ib] IIA T4 Gb	(all versions with
I M2 Ex ia [ib] I Mb	CAN bus or RS485 interface)

DEKRA EXAM GmbH
Bochum, dated 2013-09-06

Signed: Simanski
Certification body

Signed: Dr. Wittler
Special services unit

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(13) Appendix to

(14) **EC-Type Examination Certificate**
BVS 13 ATEX E 061

(15) 15.1 Subject and type

Flow Meter type MAGIN-Ex®

Type code completed

MAGIN-Ex®-*/*

MAGIN-Ex®- a/b/c/d/e/f/g/h/i/j/k/l/m/n/o/p/q/r/s/t/u/v/w/x

Position	Value	Parameter
a	=	Intrinsically safe power supply (rated voltage)
	12	DC 12 V
b	0 - ***	Flow rate measuring range
c	=	Flow rate unit
	l	l / min
	cbm	m^3 / h
	ppm	ppm
	%	%
d to l		Additional measured parameters (optional)
d	P	Pressure
e	0 - ***	Pressure range
f	(various)	Pressure unit
g	T	Temperature internal
h	-*** ≤ 0 ≤ +***	Temperature-range
i	(various)	Temperature-unit
j	T2	Temperature external
k	-*** ≤ 0 ≤ +***	Temperature-range
l	(various)	Temperature-unit
m	(various)	Rated width of the measuring tube
n	0 - ***	Permitted system-pressure in bar
o	(various)	Mechanical connection
p	=	Material of electrodes
	VA	Stainless steel
	AL	Aluminium
	TA	Tantalum
	**	further options
q	=	Additional features
	Si	Approved SIL level (according to EN 61508)
	KSI	Approved SIL level not provided
	***	further options
r	=	Electrical connection facilities
	B/H/J/S/K	Various connectors
	L***m	Permanently connected cable; length in m
s	=	Indicator
	A	Display
	KA	Display not provided
t	=	Sensor arrangement
	KG	Compact version
	AS***m	Separated sensor unit; *** = cable length in m

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Position	Value	Parameters
u, v, w, x	=	Interfaces: u = Flow rate, v = forward flow temperature w = reverse flow temperature, x = Pressure
	S0 / S4 / S**-**	current loop: 0 -20 mA / 4 -20 mA / **-** = xx mA - yy mA
	U**-**	Voltage output: **-** = xx V - yy V
	F	Frequency signal output: 5 -15 Hz
	F**	Frequency signal output: *** = xx Hz - yy Hz
	FA	Frequency signal output: 5 -15 Hz active
	F***A	Frequency signal output: *** = xx Hz -yy Hz active
	GW	Maximum- / minimum-alarm contact
	C	CAN Open
	P	RS485 (Profibus)
Remarks: - positions not used or empty position are closed up by moving the other elements to the left - the type code may be enhanced optionally with further non Ex-relevant parameters - *** or **-**: spacer for free defined non Ex-relevant parameters		

15.2 Description

The Flow Meter type MAGIN-Ex® is designated for measuring the flow rate of liquid media and optionally media-pressure and -temperature in areas requiring apparatus category 2G and M1 (EPL Gb and EPL Ma) equipment.

The Flow Meter comes with an electronics unit, which is combined either with a flow measuring chamber to a mechanical unit, or interconnected with a separate flow measuring unit.

Electronics unit housing and flow measuring unit housing are made of metal- or alternatively plastics-material providing surface resistance ≤ 10^9 Ω.

The electronics unit is subdivided into an electronics compartment containing electronics assemblies and a terminal compartment for the external IS circuits.

The side walls of terminal compartment are fitted with cable glands and / or connectors for the IS circuits (power supply, current- / voltage- / frequency-signal outputs and CAN bus / RS485 bus interface.

An inspection glass is located optionally above the LCD display in the cover of the electronics compartment; a keyboard is arranged below the cover.

The separated flow measuring unit is interconnected to the electronics unit by means of a special cable (length up to 300 m) carrying IS supply circuit of the flow measuring unit and IS CAN-bus communication circuit between flow measuring unit and electronics unit.

Electronic assemblies inside electronics unit and flow measuring unit are embedded in casting compound, except for LCD-display and keyboard.

In case of Flow Meter models providing galvanically separated signal outputs, the signal outputs and the supply circuit are connected to separate connectors or allocated to separate cables.

Flammable liquid media may be used, if they are so far free of oxygen that they do not form an explosive mixture.

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15.3 Parameters

15.3.1 Models providing signal interfaces without galvanic separation

15.3.1.1 Analogue current output

Flow Meter type MAGIN-Ex®-*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/**u**/*/*/* type MAGIN-Ex®-*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/**v**/*/* type MAGIN-Ex®-*/**w**/* type MAGIN-Ex®-*/**x** u, v, w, x = S0 or S4 or S**-**				
Parameter	Supply circuit		Signal circuit	
	r = B, H, J, S, K, **)[1])[2]	r = L***m	r = B, H, J, S, K, **)[1])[3]	r = L***m
level of protection	Ex ia IIA / I		Ex ia IIA / I	
Voltage U_i	DC 14 V		DC 14 V	
Current I_i	3 A		N / A	
Power P_i	--)[4]		N / A	
Voltage U_o	N / A		DC 9 V	
Current I_o	N / A		90 mA	
Power P_o	N / A		200 mW	
effective internal capacitance C_i	negligible		negligible	
effective internal inductance L_i	negligible		negligible	
effective internal capacitance C_i (permanently connected cable)	N / A	185 pF/m	N / A	185 pF/m
effective internal inductance L_i (permanently connected cable)	N / A	0.8 µH/m	N / A	0.8 µH/m
Ambient temperature range	-50 °C ≤ T_a ≤ +80 °C			

Remarks:
-)[1] optional other suitable connectors as specified in manufacturer's documents
-)[2] or terminals 1 (+) 2 (GND)
-)[3] or terminals as specified in the User's Manual
-)[4] any value or equal to the applied IS power supply
- N / A = not applicable

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15.3.1.2 Analogue voltage output

Flow Meter type MAGIN-Ex®-*/**u**/*/*/* type MAGIN-Ex®-*/**v**/*/*/* type MAGIN-Ex®-*/**w**/* type MAGIN-Ex®-*/**x** u, v, w, x = U**-**				
Parameter	Supply circuit		Signal circuit	
	r = B, H, J, S, K, **)[1])[2]	r = L***m	r = B, H, J, S, K, **)[1])[3]	r = L***m
level of protection	Ex ia IIA / I		Ex ia IIA / I	
Voltage U_i	DC 14 V		DC 14 V	
Current I_i	3 A		N / A	
Power P_i	--)[4]		N / A	
Voltage U_o	N / A		- 15.3.5 V ≤ U ≤ 12.6 V	
Current I_o	N / A		12 mA	
Power P_o	N / A		35 mW	
effective internal capacitance C_i	negligible		negligible	
effective internal inductance L_i	negligible		negligible	
effective internal capacitance C_i (permanently connected cable)	N / A	185 pF/m	N / A	185 pF/m
effective internal inductance L_i (permanently connected cable)	N / A	0.8 µH/m	N / A	0.8 µH/m
Ambient temperature range	-50 °C ≤ T_a ≤ +80 °C			

Remarks:
-)[1] optional other suitable connectors as specified in manufacturer's documents
-)[2] or terminals 1 (+) 2 (GND)
-)[3] or terminals as specified in the User's Manual
-)[4] any value or equal to the applied IS power supply
- N / A = not applicable

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15.3.1.3 5 - 15 Hz frequency signal (active) / xx Hz - yy Hz frequency signal (active)

FLow Meter type MAGIN-Ex®-*/**u**/*/*/* type MAGIN-Ex®-*/**v**/*/*/* type MAGIN-Ex®-*/**w**/* type MAGIN-Ex®-*/**x** u, v, w, x = FA or F***A				
Parameter	Supply circuit		Signal circuit	
	r = B, H, J, S, K, **)[1])[2]	r = L***m	r = B, H, J, S, K, **)[1])[3]	r = L***m
level of protection	Ex ia IIA / I		Ex ia IIA / I	
Voltage U_i	DC 14 V		DC 14 V	
Current I_i	3 A		--)[4]	
Power P_i	--)[4]		--)[4]	
Voltage U_o	N / A		N / A	
Current I_o	N / A		N / A	
Power P_o	N / A		N / A	
effective internal capacitance C_i	negligible		negligible	
effective internal inductance L_i	negligible		negligible	
effective internal capacitance C_i (permanently connected cable)	N / A	185 pF/m	N / A	185 pF/m
effective internal inductance L_i (permanently connected cable)	N / A	0.8 µH/m	N / A	0.8 µH/m
Ambient temperature range	$-50\ °C \leq T_a \leq +80\ °C$			

Remarks:
-)[1] optional other suitable connectors as specified in manufacturer's documents
-)[2] or terminals KL1 (+) KL2 (-)
-)[3] or terminals as specified in the User's Manual
-)[4] any value or equal to the applied IS power supply
- N / A = not applicable

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15.3.2 Devices providing signal interfaces with galvanic separation

15.3.2.1 5 - 15 Hz / xx Hz - yy Hz frequency signal circuits (passive)

FLow Meter type MAGIN-Ex®-*/**u**/*/*/* type MAGIN-Ex®-*/**v**/*/* type MAGIN-Ex®-*/**w**/* type MAGIN-Ex®-*/**x** u, v, w, x = F or F***				
Parameter	Supply circuit		Signal circuit	
	r = B, H, J, S, K, **)[1])[2]	r = L***m	r = B, H, J, S, K, **)[1])[3]	r = L***m
level of protection	Ex ia IIA / I		Ex ia IIA / I	
Voltage U_i	DC 14 V		DC 14 V	
Current I_i	3 A		--)[4]	
Power P_i	--)[4]		--)[4]	
Voltage U_o	N / A		N / A	
Current I_o	N / A		N / A	
Power P_o	N / A		N / A	
effective internal capacitance C_i	negligible		negligible	
effective internal inductance L_i	negligible		negligible	
effective internal capacitance C_i (permanently connected cable)	N / A	185 pF/m	N / A	185 pF/m
effective internal inductance L_i (permanently connected cable)	N / A	0.8 µH/m	N / A	0.8 µH/m
Ambient temperature range	$-50\ °C \leq T_a \leq +80\ °C$			

Remarks:
-)[1] optional other suitable connectors as specified in manufacturer's documents
-)[2] or terminals 1 (+) 2 (GND)
-)[3] or terminals as specified in the User's Manual
-)[4] any value or equal to the applied IS power supply
- N / A = not applicable
- the frequency signal circuits provide galvanic separation from the IS power supply circuit and from each other

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15.3.2.2 Maximum / minimum value circuits (opto-isolator outputs passive)

FLow Meter type MAGIN-Ex® -*/**u**/*/*/* type MAGIN-Ex®-*/**v**/*/* type MAGIN-Ex®-*/**w**/* type MAGIN-Ex®-*/**x** u, v, w, x = GW				
Parameter	Supply circuit		Signal circuit	
	r = B, H, J, S, K, **)[1])[2]	r = L***m	r = B, H, J, S, K, **)[1])[3]	r = L***m
level of protection	Ex ia IIA / I		Ex ia IIA / I	
Voltage U_i	DC 14 V		DC 14 V	
Current I_i	3 A		--)[4]	
Power P_i	--)[4]		--)[4]	
Voltage U_o	N / A		N / A	
Current I_o	N / A		N / A	
Power P_o	N / A		N / A	
effective internal capacitance C_i	negligible		negligible	
effective internal inductance L_i	negligible		negligible	
effective internal capacitance C_i (permanently connected cable)	N / A	185 pF/m	N / A	185 pF/m
effective internal inductance L_i (permanently connected cable)	N / A	0.8 µH/m	N / A	0.8 µH/m
Ambient temperature range	-50 °C ≤ T_a ≤ +80 °C			

Remarks:
-)[1] optional other suitable connectors as specified in manufacturer's documents
-)[2] or terminals 1 (+) 2 (GND)
-)[3] or terminals as specified in the User's Manual
-)[4] any value or equal to the applied IS power supply
- N / A = not applicable
- the maximum / minimum switch circuits provide galvanic separation from the IS power supply circuit and from each other

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15.3.2.3 CAN-bus signal circuits

FLow Meter type MAGIN-Ex®-*/**u**/*/*/* type MAGIN-Ex®-*/**v**/*/* type MAGIN-Ex®-*/**w**/* type MAGIN-Ex®-*/**x** u, v, w, x = C				
Parameter	Supply circuit		Signal circuit	
	r = B, H, J, S, K, **)[1])[2]	r = L***m	r = B, H, J, S, K, **)[1])[3]	r = L***m
level of protection	Ex ia IIA / I		Ex ib IIA / I	
Voltage U_i	DC 14 V		6.5 V	
Current I_i	3 A		145 mA	
Power P_i	--)[4]		940 mW	
Voltage U_o	N / A		6.5 V	
Current I_o	N / A		170 mA)[5]	
Power P_o	N / A		940 mW)[5]	
effective internal capacitance C_i	negligible		0.6 µF	
effective internal inductance L_i	negligible		negligible	
effective internal capacitance C_i (permanently connected cable)	N / A	185 pF/m	N / A	0.6 µF + 185 pF/m
effective internal inductance L_i (permanently connected cable)	N / A	0.8 µH/m	N / A	0.8 µH/m
Ambient temperature range	-50 °C ≤ T_a ≤ +80 °C			

Remarks:
-)[1] optional other suitable connectors as specified in manufacturer's documents
-)[2] or terminals 1 (+) 2 (GND)
-)[3] or terminals as specified in the User's Manual
-)[4] any value or equal to the applied IS power supply
-)[5] single data line value and sum value of both data lines in parallel
- N / A = not applicable
- the CAN-bus signal circuits provide galvanic separation from the IS power supply circuit and from each other

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15.3.2.4 RS485 signal circuits

FLow Meter type MAGIN-Ex®-*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/**u**/*/*/* type MAGIN-Ex®-*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/**v**/*/* type MAGIN-Ex®-*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/*/**w**/* type MAGIN-Ex®-*/**x** u, v, w, x = P				
Parameter	Supply circuit		Signal circuit	
	r = B, H, J, S, K, **)[1])[2]	r = L***m	r = B, H, J, S, K, **)[1])[3]	r = L***m
level of protection	Ex ia IIA / I		Ex ib IIA / I	
Voltage U_i	DC 14 V		4.5 V	
Current I_i	3 A		240 mA	
Power P_i	--)[4]		1000 mW	
Voltage U_o	N / A		4.5 V	
Current I_o	N / A		145 mA)[5]	
Power P_o	N / A		940 mW)[5]	
effective internal capacitance C_i	negligible		0.6 µF	
effective internal inductance L_i	negligible		negligible	
effective internal capacitance C_i (permanently connected cable)	N / A	185 pF/m	N / A	0.6 µF + 185 pF/m
effective internal inductance L_i (permanently connected cable)	N / A	0.8 µH/m	N / A	0.8 µH/m
Ambient temperature range	-50 °C ≤ T_a ≤ +80 °C			

Remarks:
-)[1] optional other suitable connectors as specified in manufacturer's documents
-)[2] or terminals 1 (+) 2 (GND)
-)[3] or terminals as specified in the User's Manual
-)[4] any value or equal to the applied IS power supply
-)[5] single data line value and sum value of both data lines in parallel versus GND
- N / A = not applicable
- the RS485 signal circuits provide galvanic separation from the IS power supply circuit and from each other

(16) Test and Assessment Report
BVS PP 13.2119 EG as of 2013-09-06

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(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.

DEKRA EXAM GmbH
44809 Bochum, 2013-09-06
BVS-Scha/Mu A 20100735

Certification body

Special services unit

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