Translation

(1) # EC-Type Examination Certificate

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

(3) # DMT 03 ATEX E 065 X

(4) **Equipment:** **Gas or Temperature Measurement Devices type MONIMET / ANNOVEX series**

(5) **Manufacturer:** **WOELKE Industrieelektronik GmbH**

(6) **Address:** **D 45239 Essen**

(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 03.1047 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"
EN 50303:2000	Equipment Group I Category M1

(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:

I M1 EEx ia I

Deutsche Montan Technologie GmbH
Essen, dated 07. April 2003

Signed: Jockers
DMT-Certification body

Signed: Eickhoff
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

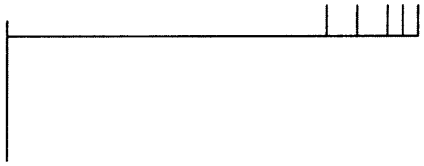
DMT 03 ATEX E 065 X

(15) 15.1 Subject and type

Gas or Temperature Measurement Devices

Type MONIMET GMM **.**.***

and. Type ANNOVEX GMA **.**.***



First and second digit : measured component

Methane (0 - 100 % CH_4)	= 01
Oxygen (0 - 30 % O_2)	= 02
Carbonmonoxide (0 -500 ppm CO)	= 03
Carbondioxide (0 - 100 % CO_2)	= 04
Hydrogen sulphide(0 - 100 ppm H_2S)	= 05
Temperature	= 10
Hydrogen (0 - 1000 ppm H_2)	= 11
Nitrogen (0 - 100 % N_2)	= 12
Nitrogendioxide (0 - 100 ppm NO_2)	= 14

Third and fourth digit : type of sensor / principle of measurement

1 Pellistor pair; measurement range 0...5% CH_4	= 01
1 Pellistor; measurement range 0...100% CH_4	= 02
1 Pellistor pair;2 measurement ranges 0...5...100% CH_4	= 03
NDIR Gas analysis	= 04
Electro-chemical cell	= 05
Temperature sensor; platinum	= 10
Thermal conductivity (Gas extraction)	= 13
NDIR Gas analysis (Gas extraction)	= 14

Fifth digit: configuration and designation

Sensor / transmitter without display, plug connection	= 1
Sensor / transmitter with display, plug connection	= 2
Monitor, plug connection	= 3
Evaluator, plug connection	= 5
Evaluator, clamp connections	= 6

Sixth digit: signal output (measured value)

Analogue output 5/6 -15 Hz	= 1
Analogue output 0,1 - 1 mA	= 3
Analogue output 0,2 - 1 mA	= 4
Analogue output 4 - 20 mA	= 5
Analogue output 0,4 - 2 V	= 6
Analogue output 1 - 5 V	= 7
Digital-output	= 8

Seventh digit: signal-outputs of limit-value indicators (switch contact)

without limit-value indicator	= 0
2 opto-couplers	= 1
2 relays	= 3
1 opto-coupler, 1 relay	= 5

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DMT

15.2 Description

The Gas or Temperature Measurement Devices type MONIMET GMM **.**.*** / ANNOVEX GMA **.**.*** - used as gas or temperature measurement devices (Sensor/Transmitter) or monitoring devices (Monitor) – consist of a universal evaluator electronic circuitry (Transmitter type AMT 100 and type AMT 200) and a sensor (type WTL-xx.0x or IRS-xx.04 or ECH-xx.05.0x or TEM-10.10).

The sensor for measurement of gas-components of mine air under atmospheric environment conditions or temperature respectively, is installed in an entry hole on the lower side of the enclosure containing the evaluator electronics.

The operating- and display-facilities, such as Reed-switches, LCD-display and LEDs, are installed below the enclosure cover fitted with an inspection pane.

The intrinsically safe circuits of the gas- or temperature measurement devices (power supply, serial interfaces, current-, frequency- and alarm-outputs) are connected to one or two multiple pole plug connectors which are placed on the lower or upper side of the enclosure. They can also be connected to a terminal block installed inside the enclosure. In this case, 4 additional cable entry glands are screwed in the lower face of the enclosure of the evaluator electronics.

The Gas or Temperature Measurement Devices type MONIMET GMM **.**.*** / ANNOVEX GMA **.**.*** - used as evaluator devices (Evaluator) - consist of a universal evaluator electronic (Transmitter type AMT 100 and type AMT 200) without sensor but optionally providing a larger enclosure fitted with additional terminals for connecting and distributing purposes of intrinsically safe circuits.

Instead of the sensor, additional cable entry glands and/or plug connectors for intrinsically safe circuits are mounted at the lower face of the enclosure of the evaluator electronic.

The versions of the devices "MONIMET" or "ANNOVEX" respectively, provide different enclosure materials,
ANNOVEX: synthetic resin enclosure, surface resistance $\leq 10^9\ \Omega$.
MONIMET: metal enclosure.

15.3 Parameters

Connection facilities: connector X1 or 12-pole terminal block

15.3.1 Power supply circuit
Connector pins No. 1 (GND) and 2 (+) or marked terminals

Voltage	U_i	DC	16	V
Current consumption (Type AMT 100)	I_N	≤	100	mA
Current consumption (Type AMT 200)	I_N	≤	200	mA
Effective internal capacitance	C_i	≤	110	nF
Effective internal inductance	L_i	≤	5	µH

15.3.2 Frequency-signal output (opto-coupler output)
Connector pins No 4 (-) and 5 (+) or marked terminals

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

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15.3.3 Current output (alternative to 15.3.2)
Connector pins No. 4 (-) and 5 (+) or marked terminals

Voltage	U_o	DC 9.55	V
Current	I_o	10	mA
Power	P_o	24	mW
Voltage	U_i	DC ≤ 2.2	V
Power	P_i	333	mW
Effective internal capacitance	C_i	negligible	
Effective internal inductance	L_i	≤ 5	µH

15.3.4 Serial interface
Connector pins No 12 (output) / 13 (input) and 1 (GND) or marked terminals

Voltage	U_o	DC 9.55	V
Current value	I_o	10	mA
Power	P_o	24	mW
Effective internal inductive capacity	C_i	negligible	
Effective internal inductive capacity	L_i	negligible	

15.3.5 Alarm-signal circuits providing relay-contacts
Alarm 1: Connector pins No 7(-) and 15(+) or marked terminals
Alarm 2: Connector pins No 9(-) and 10(+) or marked terminals

Voltage	U_i	DC 30	V
Current	I_i	1	A
Power	P_i	30	W
Effective internal capacitance	C_i	negligible	
Effective internal inductance	L_i	negligible	

15.3.6 Alarm-signal circuits providing opto-couplers (alternative to 15.3.5)
Alarm 1: Connector pins No 7(-) and 15(+) or marked terminals
Alarm 2: Connector pins No 9(-) and 10(+) or marked terminals

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

15.3.7 Ambient temperature range: $-20°C \leq T_a \leq +60°C$
devices fitted with electro-chemical sensors $-20°C \leq T_a \leq +50°C$

(16) Test and assessment report
BVS PP 03.1047 EG as of 07.04.2003

(17) Special conditions for safe use

17.1 The data sheets provided by the manufacturers of the electro-chemical sensors shall be observed.

17.2 The measuring function with regard to explosion protection according to Standards EN 50054 and EN 50058 is not within the scope of this EC-Type Examination Certificate.

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, 07.04.2003
BVS-Scha/Mi A 20030042

Deutsche Montan Technologie GmbH

DMT-Certification body

Head of special services unit

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