



Translation

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

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

(3) **DMT 00 ATEX E 092 X**

(4) **Equipment: Pre-amplifier type PV24**

(5) **Manufacturer: Bopp & Reuther Messtechnik GmbH**

(6) **Address: 68305 Mannheim**

(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 00.2083 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 ib IIC T6/5**

**Deutsche Montan Technologie GmbH**

Essen, dated 12. December 2000

Signed: Jockers

Signed: Dill

DMT-Certification body

Head of special services unit

(13)

Appendix to

(14)

# EC-Type Examination Certificate

## DMT 00 ATEX E 092 X

(15) 15.1 Pre-amplifier type PV24

### 15.2 Description

The Pre-amplifier type PV24 is used to amplify signals of a density sensor.

The classification of temperature class and maximum ambient temperature can be take from the following table:

Temperature class	Maximum ambient temperature
T6	70 °C
T5	85 °C

The minimum ambient temperature is  $-50\text{ °C}$

### 15.3 Parameters

#### 15.3.1 Supply circuit (terminals: + / -)

voltage $U_i$	30	V
current $I_i$	93	mA
power $P_i$	653	mW
effective internal capacitance $C_i$	negligible	
effective internal inductance $L_i$	0,2	mH

#### 15.3.2 Sensor circuit (terminals: ws / sw)

voltage $U_o$	1	V
current $I_o$	11	mA
power $P_o$	3	mW
max. external capacitance $C_o$	200	$\mu\text{F}$
max. external inductance $L_o$	280	mH

#### 15.3.2 Field control circuit (terminals: bl / ge)

voltage $U_o$	6,6	V
current $I_o$	86	mA
power $P_o$	142	mW
max. external capacitance $C_o$	3	$\mu\text{F}$
max. external inductance $L_o$	5	mH

(16) Test and assessment report  
BVS PP 00.2083 EG as of 12.12.2000

(17) Special conditions for safe use

17.1 The Pre-amplifier type PV24 shall be installed in an enclosure which at least complies with degrees of protection IP 54 as defined in IEC publication 529

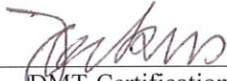
17.2 The Pre-amplifier type PV24 may be used in ambient temperatures of  $-50^{\circ}\text{C}$  up to  $70/85^{\circ}\text{C}$  (depending on the temperature class T6/T5).

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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, 12.12.2000  
BVS-Kann/Hm A 20000684

**Deutsche Montan Technologie GmbH**



DMT-Certification body



Head of special services unit



# 1<sup>st</sup> Supplement

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

## to the EC-Type Examination Certificate DMT 00 ATEX E 092 X

**Equipment:** Pre-amplifier type PV24 / type PV24X  
**Manufacturer:** Bopp & Reuther Messtechnik GmbH  
**Address:** 67346 Speyer, Germany

### Description


The Pre-amplifier can be modified according to the descriptive documents as mentioned in the pertinent test and assessment report and is marked with the following designation:

Pre-amplifier type PV24 (IS apparatus)  
Pre-amplifier type PV24X (associated apparatus)

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

EN 60079-0:2006 General requirements (PV24, PV24X)  
EN 60079-1:2004 Flameproof enclosure 'd' (PV24X)  
EN 60079-11:2007 Intrinsic safety 'i' (PV24, PV24X)

The marking of the equipment shall include the following:

 II 2G Ex ib IIC T5 / T6 (PV24)  
II 2G Ex d [ib] IIC T4 (PV24X)

The Pre-amplifier type PV24 is extended with version Pre-amplifier type PV24X.

The Pre-amplifier type PV24X consists of a electronic housing closed with threaded covers. The electronic housing provides two compartments of different size, one designed as flameproof terminal compartment the other one designed as electronic compartment fitted with intrinsically safe electronic modules.

For electrical and optionally mechanical mounting purposes of an associated density sensor (electrically energized mechanical resonance device), the housing is fitted with an adapter. The density sensor may be separated from or directly combined with the enclosure. The adapter is related to the electronic compartment.

The density sensor is not subject to the certificate.



The terminal compartment - type of protection flameproof enclosure "d" - is equipped with a combined current limiting and safety shunt assembly module, providing terminals for interconnection of the non intrinsically safe 4 - 20 mA supply and signal circuit. A cable entry certified for this purpose is used to lead the non-intrinsically safe circuit into the terminal compartment.

The intrinsically safe output circuit of the current limiting and safety shunt assembly module is led into the electronic compartment via feed-through capacitors.

The electronic compartment of the Pre-amplifier type PV24X only contains the unchanged intrinsically safe electronic module of the certified Pre-amplifier type PV24, transferring measuring data from an intrinsically safe resonance sensor circuit into the non-intrinsically safe 4 - 20 mA supply and signal circuit.

#### Parameters

1. Pre-amplifier type PV24  
No change.

2. Pre-amplifier type PV24X

2.1 Non intrinsically safe supply and signal circuit

Nominal voltage	$U_N$	DC	24	V
maximum operating voltage without damage		DC	28,5	V
	$U_m$	AC	250	V
Power consumption	$P_N$		1	W

2.2 Sensor circuit  
(Terminals: ws / sw)

Voltage	$U_o$		1	V
Current	$I_o$		11	mA
Power	$P_o$		3	mW
max. external capacitance	$C_o$		200	$\mu$ F
max. external inductance	$L_o$		280	mH

2.3 Field circuit  
(Terminals: bl / ge)

Voltage	$U_o$		6,6	V
Current	$I_o$		86	mA
Power	$P_o$		142	mW
max. external capacitance	$C_o$		3	$\mu$ F
max. external inductance	$L_o$		5	mH

2.4 Ambient temperature range :  $-40\text{ }^{\circ}\text{C} \leq T_a \leq +60\text{ }^{\circ}\text{C}$

Special conditions for safe use

1. Pre-amplifier type PV24
  - 1.1 The Pre-amplifier type PV24 shall be installed in an enclosure which at least complies with degrees of protection IP 54 as defined in EN 60529.
  - 1.2 The Pre-amplifier type PV24 may be used in ambient temperatures of  $-50^{\circ}\text{C}$  up to  $70/85^{\circ}\text{C}$  (depending on the temperature class T6/T5).
2. Pre-amplifier type PV24X
  - 2.1 The widths of the flameproof joints of this apparatus are in parts longer and its gaps are in parts smaller than required by Table 2 of EN 60079-1:2004. If any of the parts forming the joint shall be replaced or repaired, the dimensions of the joint have to be kept according to the gap table listed in test and assessment report BVS PP 00.2011 EG.
  - 2.2 Wiring:  
The flexible wires of the non-IS circuit shall be fixed / mechanically protected against movement inside the terminal compartment in a suitable manner, so that a moving or loosen wire cannot contact the IS side within the range of movement.
  - 2.3 The "-" - terminal of the non-intrinsically safe supply and signal circuit is interconnected to the housing. Grounding of the non intrinsically safe supply and signal circuit / of the housing shall comply with clause 6.5 of EN 60079-11:2007.
  - 2.4 The Pre-amplifier type PV24 may be used in the ambient temperature range  $-40^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$ .

Test and assessment report

BVS PP 00.2083 EG as of 23.10.2007

**DEKRA EXAM GmbH**

Bochum, dated 23. October 2007

Signed: Dr. Jockers  
Certification body

Signed: Dr. Eickhoff  
Special services unit

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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, 23. October 2007  
BVS-Scha/Sz A 20070017

**DEKRA EXAM GmbH**



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Certification body



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Special services unit