



Translation

**EC-Type Examination Certificate**

- (1)
- (2) **- Directive 94/9/EC -**  
**Equipment and protective systems intended for use**  
**in potentially explosive atmospheres**
- (3) **DMT 02 ATEX E 156 X**
- (4) **Equipment: Massedurchfluss-Sensor Type D\* \*\*\* \* \*\*\*\* B**
- (5) **Manufacturer: Micro Motion, Inc.**
- (6) **Address: Boulder, Co. 80301, USA**
- (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 02.2083 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 IIB/IIC T1-T6**

**Deutsche Montan Technologie GmbH**  
Essen, dated 09. August 2002

Signed: Eickhoff

DMT-Certification body

Signed: Wittler

Head of special services unit



(13) Appendix to

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

**DMT 02 ATEX E 156 X**

(15) 15.1 Subject and type

Sensor type D\* \*\*\*\* \* \*\*\*\* B

Instead of the \*\*\* in the complete denomination letters and numerals will be inserted which characterize variations.

The following marking is possible:

| Type           | Marking                 |
|----------------|-------------------------|
| D*025 * **** B | II 2 G EEx ib IIC T1-T6 |
| DH038 * **** B | II 2 G EEx ib IIC T1-T6 |
| D*040 * **** B | II 2 G EEx ib IIC T1-T6 |
| D*065 * **** B | II 2 G EEx ib IIC T1-T6 |
| DL050X **** B  | II 2 G EEx ib IIC T1-T6 |
| DL065 * **** B | II 2 G EEx ib IIC T1-T6 |
|                |                         |
|                |                         |

| Type           | Marking                 |
|----------------|-------------------------|
| D*100 * **** B | II 2 G EEx ib IIB T1-T6 |
| DL100 * **** B | II 2 G EEx ib IIB T1-T6 |
| D*150 * **** B | II 2 G EEx ib IIB T1-T6 |
| DL200 * **** B | II 2 G EEx ib IIB T1-T6 |
| D*300 * **** B | II 2 G EEx ib IIB T1-T6 |
| DT065 * **** B | II 2 G EEx ib IIB T1-T6 |
| DT100 * **** B | II 2 G EEx ib IIB T1-T6 |
| DT150 * **** B | II 2 G EEx ib IIB T1-T6 |

15.2 Description

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

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

15.3 Parameters

15.3.1. Drive circuit (connections 1 - 2 or wires red and brown)

|                               |    | Transmitter in combination with processor Model 700 | other transmitters |
|-------------------------------|----|---|--------------------|
| Voltage                       | Ui | DC 10,5 V   | DC 11,4 V          |
| Current                       | Ii | 2,45 A  | 1,14 A             |
| Rated current of barrier fuse |    | 160 mA  | 250 mA             |
| power                         | Pi | 2,54 W  | 1,2 W              |
| Barrier resistance            | Ri | 4,32 Ω  | 10 Ω               |

effective internal capacitance

negligible



| Sensor type    | Inductance [mH] | Coil resistance [ $\Omega$ ]<br>at -20 °C | Serial resistor [ $\Omega$ ]<br>at-20 °C |
|----------------|-----------------|---|--|
| D*025 * **** B | 6,9             | 106,2                                     | 946,6                                    |
| DH038 * **** B | 6,9             | 106,2                                     | 946,6                                    |
| D*040 * **** B | 6,9             | 106,2                                     | 946,6                                    |
| D*065 * **** B | 0,2             | 3,16                                      | 482,6                                    |
| DL050X **** B  | 0,2             | 3,16                                      | 189,3                                    |
| DL065 * **** B | 0,2             | 3,16                                      | 482,6                                    |
| D*100 * **** B | 32,8            | 108,7                                     | 48,3                                     |
| DL100 * **** B | 32,8            | 108,7                                     | 48,3                                     |
| D*150 * **** B | 32,8            | 108,7                                     | 48,3                                     |
| DL200 * **** B | 3               | 35,8                                      | 9,5                                      |
| D*300 * **** B | 3               | 35,8                                      | 9,5                                      |

| Sensor type    | Inductance [mH] | Coil resistance [ $\Omega$ ]<br>at +32 °C |
|----------------|-----------------|---|
| DT065 * **** B | 3               | 44  |
| DT100 * **** B | 3               | 44  |
| DT150 * **** B | 3               | 44  |

15.3.2 Pick-Off coil (Terminals 5/9 and 6/8 or wires green/white and blue/grey)

|         |                |    |      |    |
|---------|----------------|----|------|----|
| Voltage | U <sub>i</sub> | DC | 17,3 | V  |
| Current | I <sub>i</sub> |    | 6,9  | mA |
| Power   | P <sub>i</sub> |    | 30   | mW |

effective internal capacitance negligible

| Sensor type    | Inductance [mH] | coil resistance [ $\Omega$ ]<br>at -20 °C |
|----------------|-----------------|---|
| D*025 * **** B | 6,9             | 106,2                                     |
| DH038 * **** B | 6,9             | 106,2                                     |
| D*040 * **** B | 6,9             | 106,2                                     |
| D*065 * **** B | 0,2             | 3,16                                      |
| DL050X **** B  | 0,2             | 3,16                                      |
| DL065 * **** B | 0,2             | 3,16                                      |
| D*100 * **** B | 6,18            | 113,8                                     |
| DL100 * **** B | 6,18            | 113,8                                     |
| D*150 * **** B | 6,18            | 113,8                                     |
| DL200 * **** B | 6,18            | 113,8                                     |
| D*300 * **** B | 6,18            | 113,8                                     |

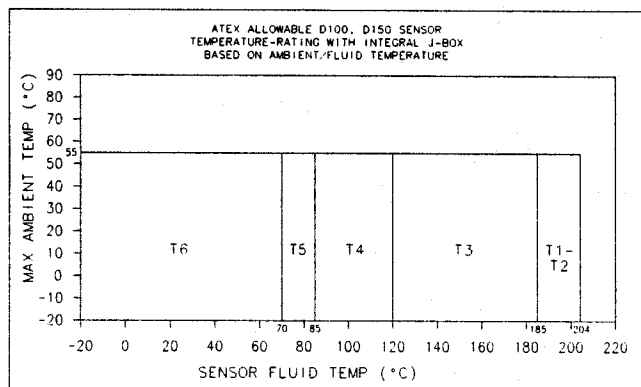
| Sensor type    | Inductance [mH] | Coil resistance [ $\Omega$ ]<br>at +32 °C |
|----------------|-----------------|---|
| DT065 * **** B | 1,2             | 15,7                                      |
| DT100 * **** B | 1,2             | 15,7                                      |
| DT150 * **** B | 1,2             | 15,7                                      |

15.3.3 Temperature sensor circuit (terminals 3, 4 and 7 or wires orange, yellow and violet)

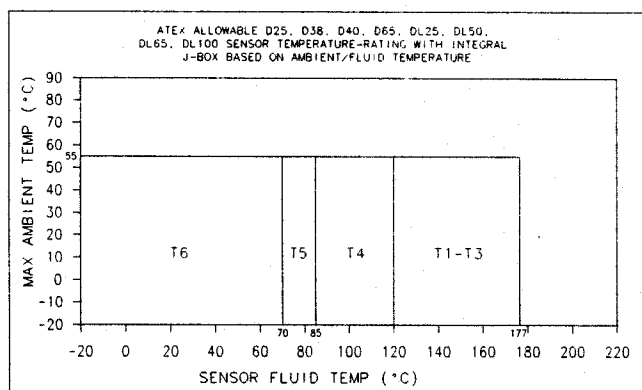
|                                |    |    |            |    |
|--------------------------------|----|----|------------|----|
| Voltage                        | Ui | DC | 17,3       | V  |
| Current                        | Ii |    | 26         | mA |
| Power                          | Pi |    | 112        | mW |
| effective internal capacitance | Ci |    | negligible |    |
| effective internal inductance  | Li |    | negligible |    |

15.3.4 Regulation of temperature class  
 The classification into a temperature class depends on the temperature of the medium taking into account the maximum operating temperature of the sensor and is shown in the following graphs:

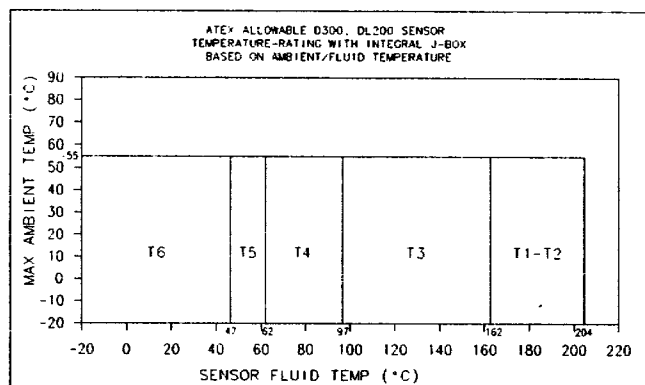
15.3.4.1 Type D100 \* \*\*\*\* B and Type D150 \* \*\*\*\* B



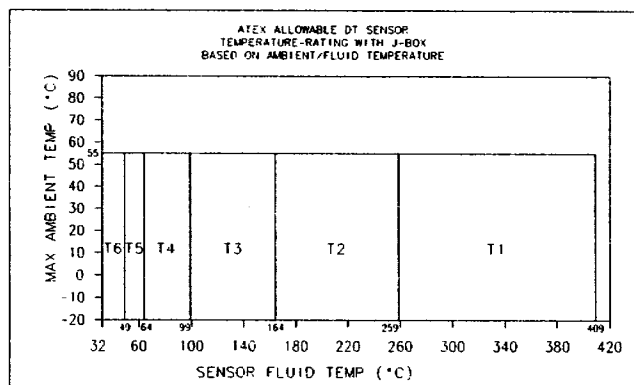
15.3.4.2 Type D\*025 \* \*\*\*\* B, Type DH038 \* \*\*\*\* B, Type D\*040 \* \*\*\*\* B, Type D\*065 \* \*\*\*\* B, Type DL050X \* \*\*\*\* B, Type DL065 \* \*\*\*\* B and Type DL100 \* \*\*\*\* B



### 15.3.4.3 Type D\*300 \* \*\*\*\* B and Type DL200 \* \*\*\*\* B



### 15.3.4.4 Type DT065 \* \*\*\*\* B, Type DT100 \* \*\*\*\* B and Type DT150 \* \*\*\*\* B



15.3.5 Ambient temperature range  $T_a$  -20 °C bis +55 °C

The use of the sensor at higher ambient temperatures is possible, provided that the ambient temperature does not exceed the maximum temperature of the medium taking into account the temperature classification and the maximum operating temperature of the sensor.

The ambient temperature of the sensor may be less than -20 °C provided the temperature of the medium is not less than 0 °C.

(16) Test and assessment report  
BVS PP 02.2083 EG as of 09.08.2002

(17) Special condition for safe use  
The sensors type DT065 \* \*\*\*\* B, type DT100 \* \*\*\*\* B and type DT150 \* \*\*\*\* B are designed only for use at temperatures of the medium of  $\geq +32$  °C.



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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, 09.08.2002  
BVS-Schu/Mi A 20020305

**Deutsche Montan Technologie GmbH**

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DMT-Certification body

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Head of special services unit



# Translation



## 1<sup>st</sup> Supplement

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

### to the EC-Type Examination Certificate DMT 02 ATEX E 156 X

**Equipment:** Sensor type D\* \*\*\* \* \*\*\*\*B  
**Manufacturer:** Micro Motion, Inc.  
**Address:** Boulder, Co. 80301, USA

#### Description

The sensors type D\*100 \* \*\*\*\*B , type DL100 \* \*\*\*\*B and type D\*150 \* \*\*\*\*B mentioned until now have been modified and are therefore additionally marked with C.I.C (Construction Identification Code) A1 to identify this modification..

The Essential Health and Safety Requirements of the modified equipment are assured by compliance with:  
EN 50014:1997+A1-A2 General requirements  
EN 50020:1994 Intrinsic safety 'i'

#### Marking of the different sensors

##### C.I.C A1

| Type          | Marking               |
|---------------|-----------------------|
| D*100 * ****B | II2G EEx ib IIB T1-T6 |
| DL100 * ****B | II2G EEx ib IIB T1-T6 |
| D*150 * ****B | II2G EEx ib IIB T1-T6 |

#### Parameters

1 Type D\*100 \* \*\*\*\*B , type DL100 \* \*\*\*\*B and type D\*150 \* \*\*\*\*B  
C.I.C (Construction Identification Code) A1

1.1 Drive circuit (connections 1 - 2 or red and brown)

|         |                |    |      |   |
|---------|----------------|----|------|---|
| Voltage | U <sub>i</sub> | DC | 11,4 | V |
| Current | I <sub>i</sub> |    | 2,45 | A |
| Power   | P <sub>i</sub> |    | 2,54 | W |

effective internal capacitance negligible

| Sensor type                                     | Inductance [mH] | Coil resistance at -20 °C [Ω] | Serial resistor at -20 °C [Ω] |
|---|-----------------|-------------------------------|-------------------------------|
| D*100 * ****B<br>DL100 * ****B<br>D*150 * ****B | 32,8            | 108,7                         | 59,3                          |

1.2 Pick-Off coil (Terminals 5/9 and 6/8 or wire colour green/white and blue/grey)

|         |                |    |      |    |
|---------|----------------|----|------|----|
| Voltage | U <sub>i</sub> | DC | 17,3 | V  |
| Current | I <sub>i</sub> |    | 6,9  | mA |
| Power   | P <sub>i</sub> |    | 30   | mW |

effective internal capacitance

negligible

| Sensor type                                     | Inductance [mH] | Coil resistance at -20 °C [Ω] | Serial resistor at -20 °C [Ω] |
|---|-----------------|-------------------------------|-------------------------------|
| D*100 * ****B<br>DL100 * ****B<br>D*150 * ****B | 6,18            | 113,8                         | 0                             |

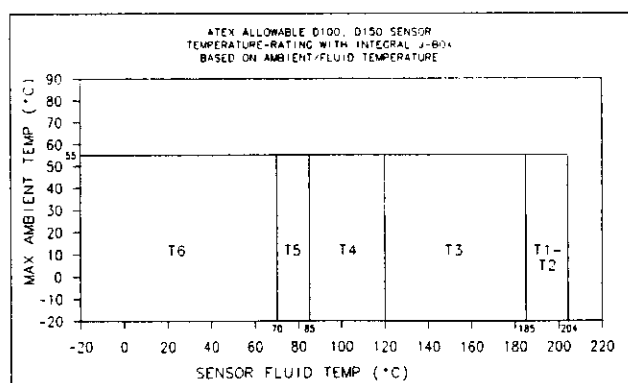
1.3 Temperature-circuit (terminals 3, 4 and 7 or wires orange, yellow and violet)

|                                |                |    |            |    |
|--------------------------------|----------------|----|------------|----|
| Voltage                        | U <sub>i</sub> | DC | 17,3       | V  |
| Current                        | I <sub>i</sub> |    | 26         | mA |
| Power                          | P <sub>i</sub> |    | 112        | mW |
| effective internal capacitance | C <sub>i</sub> |    | negligible |    |
| effective internal inductance  | L <sub>i</sub> |    | negligible |    |

1.4 Regulation of temperature class

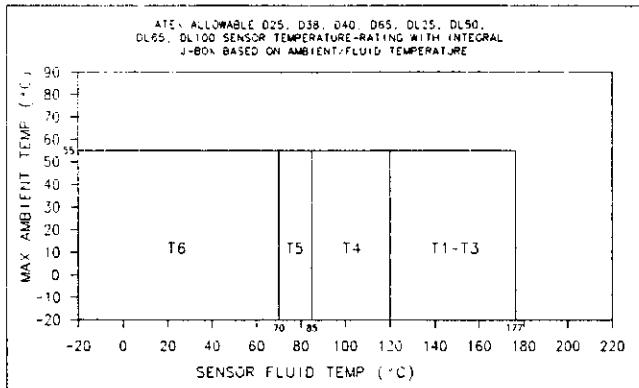
The classification into a temperature class depends on the temperature of the medium taking into account the maximum operating temperature of the sensor and is shown in the following graph:

1.4.1 Type D100 \* \*\*\*\* B and type D150 \* \*\*\*\* B

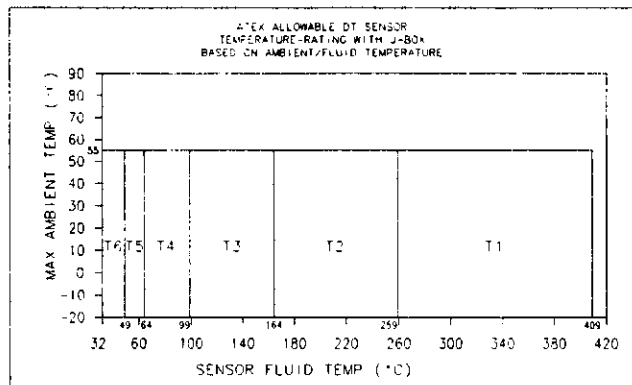




1.4.2 Type DL100 \* \*\*\*\* B



1.4.3 Type DT100 \* \*\*\*\* B



1.5 Ambient temperature range

Ta -20 °C up to +55 °C

The use of the sensor at higher ambient temperatures is possible, provided that the ambient temperature does not exceed the maximum temperature of the medium taking into account the temperature classification and the maximum operating temperature of the sensor.

The ambient temperature of the sensor may be less than -20°C provided the temperature of the medium is not less than 0°C.

Special condition for safe use

The sensors type DT065 \* \*\*\*\* B, type DT100 \* \*\*\*\* B and type DT150 \* \*\*\*\* B are designed only for use at temperatures of the medium of  $\geq +32$  °C.



Test and assessment report  
BVS PP 02.2083 EG as of 04.04.2003

**Deutsche Montan Technologie GmbH**  
Essen, dated 04. April 2003

signed: Migenda  
\_\_\_\_\_  
DMT-Certification body

signed: Wittler  
\_\_\_\_\_  
Head of 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.

45307 Essen, 04.04 2003  
BVS-Schu/Mi A 20030069

**Deutsche Montan Technologie GmbH**

*Migenda*  
\_\_\_\_\_  
DMT-Certification body

*Wittler*  
\_\_\_\_\_  
Head of special services unit



Translation



## 2<sup>nd</sup> Supplement

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

### to the EC-Type Examination Certificate DMT 02 ATEX E 156 X

**Equipment:** Sensor type D\* \* \* \* \* B  
**Manufacturer:** Micro Motion, Inc.  
**Address:** Boulder, Co. 80301, USA

Description

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

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'

Test and assessment report

BVS PP 02.2083 EG as of 10.12.2003

### Deutsche Montan Technologie GmbH

Bochum, dated 10. December 2003

Dr. Jockers

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

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, 10.12.2003  
BVS-Schu/Mi A 20030397

Deutsche Montan Technologie GmbH

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

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Special services unit